

**UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION**

Pacific Gas and Electric Company

Project No. 2107-016 – CA

NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL ASSESSMENT

(March 29, 2007)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission) regulations, 18 CFR Part 380 (Order No. 486, 52 F.R. 47897), the Office of Energy Projects has reviewed the application for license for the Poe Hydroelectric Project, located on the North Fork Feather River in Butte County, California, and has prepared a final environmental assessment (EA) for the project. A draft EA was prepared and issued for public comment on August 2, 2006. The project occupies 144 acres of lands of the United States, which are administered by the Forest Supervisor of the Plumas National Forest.

The final EA contains the staff's analysis of the potential environmental impacts of the project and alternatives and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the final EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website at <http://www.ferc.gov> using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, (202) 502-8659.

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Philis J. Posey
Acting Secretary

**FINAL
ENVIRONMENTAL ASSESSMENT**

POE HYDROELECTRIC PROJECT

(Project No. 2107-016)

California

Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, N.E.
Washington, DC 20426

March 2007

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
APE	area of potential effects
Applicant	Pacific Gas and Electric Company
AW	American Whitewater
Basin Plan	Central Valley Regional Water Quality Control Board Basin Plan
Boating Groups	American Whitewater Affiliation, Chico Paddleheads, and Shasta Paddlers
Caltrans	California Department of Transportation
CA/MX	California-Mexico Power Area
CDBW	California Department of Boating and Waterways
CDFA	California Department of Food and Agriculture
Cal Fish and Game	California Department of Fish and Game
CDPR	California Department of Parks and Recreation
CDWR	California Department of Water Resources
cfs	cubic feet per second
CNPS	California Native Plant Society
Commission	Federal Energy Regulatory Commission
CRIMP	Cultural Resources Inventory and Management Plan
CRLF	California red-legged frog
CSC	state species of concern
CVRWQCB	Central Valley Regional Water Quality Control Board
DO	dissolved oxygen
EA	environmental assessment
EIS	environmental impact statement
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
EPT	Ephemeroptera, Plecoptera, and Tricoptera
ERC	Ecological Resources Committee
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture, Forest Service
FPA	Federal Power Act
FSS	Forest Service sensitive species
FWS	U.S. Fish and Wildlife Service
FYLF	foothill yellow-legged frog
GANDA	Garcia and Associates
GWh	gigawatt-hours
HPMP	Historic Properties Management Plan
HSC	habitat suitability criteria
IFIM	Instream Flow Incremental Methodology
Interior	U.S. Department of the Interior

kV	kilovolt
kVA	kilovolt-amperes
KVP	key viewpoints
kW	kilowatt
kWh	kilowatt-hours
LRMP	Land and Resource Management Plan
LWD	large woody debris
mg/l	milligrams per liter
ml	milliliters
mm	millimeters
MW	megawatts
msl	mean sea level
National Register	National Register of Historic Places
NERC	North American Electric Reliability Council
NFFR	North Fork Feather River
NFS	National Forest System
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NMFS	National Oceanographic and Atmospheric Administration, National Marine Fisheries Service
NPS	National Park Service
NTU	nephelometric turbidity unit
PA	programmatic agreement
PG&E	Pacific Gas and Electric Company
PHABSIM	Physical Habitat Simulation
REA	ready for environmental analysis
SA	settlement agreement
SD1	Scoping Document 1
SD2	Scoping Document 2
SHPO	State Historic Preservation Officer
SNTEMP	stream network water temperature
SSTEMP	stream segment temperature
USGS	United States Geological Survey
VELB	valley elderberry longhorn beetle
Water Board	California State Water Resources Control Board
WECC	Western Electricity Coordinating Council
WQC	water quality certification
WTM	water temperature moderation
WUA	weighted usable area

SUMMARY

On December 16, 2003, Pacific Gas and Electric Company (PG&E or applicant) filed an application for license with the Federal Energy Regulatory Commission (Commission or FERC) for a new license for the 143-megawatt Poe Hydroelectric Project, FERC No. 2107, located on the North Fork Feather River, in the vicinity of the community of Pulga, in Butte County, California. The project occupies 144 acres of lands of the United States, which are administered by the Forest Supervisor of the Plumas National Forest. PG&E proposes to continue operating the Poe Project in a peaking mode, but to increase minimum flows in the 7.6-mile-long bypassed reach. The project would continue to operate in a base-load mode during periods of high river flow. PG&E proposes no new construction or additional capacity. In this environmental assessment (EA), we analyze the effects of (1) PG&E's proposed action, (2) PG&E's proposed action with staff modifications, and (3) no action.

As currently licensed, the Poe Project diverts up to about 3,000 cfs of flow from the North Fork Feather River at the Poe dam to the Poe powerhouse. The presence of Poe dam and the diversion alter the natural streamflow of the river, impounding a narrow 1.7-mile-long, 53-acre reservoir above the dam, converting riverine habitat to a more lake-like habitat, and replacing higher, naturally varying flows in 7.6 miles of the river below the dam, when flows into the project are less than 3,000 cfs (typically during summer and fall). These lower flows are susceptible to some warming during summer months. The Poe dam also impedes fish movements in the river. Peaking releases from the Poe powerhouse result in highly variable streamflows downstream of the project during summer and fall.

Based on our analysis, we recommend licensing the project as proposed by PG&E, with some staff modifications and additional measures. The recommended staff modifications and additional measures include, or are based in part on, recommendations made by federal and state agencies and other entities that have an interest in the resources potentially affected by continued project operation. We recommend most of the measures proposed by PG&E for the enhancement of fish and wildlife and recreational opportunities including the continued operation of stream gage NF23; surveys for sensitive wildlife species; certain recreational improvements at Sandy Beach, Bardee's Bar, Poe Beach, and Poe powerhouse; provision of a scenic viewpoint on Highway 70; modification of the project boundary to include additional lands; certain visual enhancements; and monitoring two archaeological sites. PG&E's proposed measures are described in detail in section III.A.3.

We also recommend staff modifications to PG&E's measures and additional measures in any license issued for the Poe Project for the enhancement of aquatic resources including the provision of increased minimum flows, interim ramping rates, and interim pulse flows; plans for implementing pulse flows and ramping rates, stream

gage management, and summertime water temperature monitoring; monitoring plans for the effects of the increased flows, ramping rates, and pulse flows on fisheries, benthic macroinvertebrates, and amphibians; accessibility of tributary streams for rainbow trout summer rearing and coldwater refugia; and filing a comprehensive report on instream flow monitoring every 6 years. Staff-recommended measures to enhance plants and wildlife include the annual review of sensitive species lists and resurveying areas with known sensitive species, and management plans for riparian habitat monitoring, invasive weeds, and bald eagle. For the enhancement of recreational facilities and opportunities, land use, and cultural resources, staff recommended measures include a recreation management plan, a feasibility study for alternative trail improvements between Bardee's Bar and the Poe powerhouse; improved public angler access; provision of stream flow information to the public; plans for road management, fire prevention and response, fuel treatment, and spoil pile revegetation; and a visual management plan and a historic properties management plan. Staff modifications to PG&E's proposed measures and additional measures are detailed in section III.B.

Overall, these measures, along with the standard articles provided in any license issued for the project, would protect/enhance water quality, fisheries, wetlands, wildlife, recreation, visual, and cultural resources within the project area. In addition, the electricity generated by the project would be beneficial because it would continue to reduce the use of fossil-fueled, electric generating plants; conserve non-renewable energy resources; and continue to reduce atmospheric pollution.

In section VI, *Developmental Analysis*, of this EA, we estimate the annual net benefits of operating and maintaining the project under the three alternatives identified above. Our analysis shows that the annual net benefit would be \$25,556,230 for the no-action alternative; \$24,239,780 for PG&E's proposed project; and \$23,497,310 for PG&E's proposed project with staff's recommended changes and additional measures.

On the basis of our independent analysis, we conclude that issuing a new license for the project, with the environmental measures that we recommend, would not be a major federal action significantly affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

FEDERAL ENERGY REGULATORY COMMISSION OFFICE OF ENERGY PROJECTS DIVISION OF HYDROPOWER LICENSING

Poe Hydroelectric Project FERC Project No. 2107-016 California

I. APPLICATION

On December 16, 2003, Pacific Gas and Electric Company (PG&E or applicant) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) for a new license for the 143-megawatt (MW) Poe Project, FERC No. 2107, located on the North Fork Feather River (NFFR), near the community of Pulga, in Butte County, California (figure 1). The project has an average annual generation of 583 gigawatt-hours (GWh). The Poe Project occupies 144 acres of lands of the United States, which are administered by the Forest Supervisor of the Plumas National Forest.

II. PURPOSE AND NEED FOR ACTION

A. PURPOSE OF ACTION

The Commission must decide whether to relicense the project and what conditions, if any, should be placed on any new license issued. Issuing a license would allow PG&E to continue generating electricity for the term of that license, making electric power from a renewable source available to its customers.

In this environmental assessment (EA), we assess the environmental and economic effects of the proposed project, alternatives to the proposed project, and a no-action alternative, and recommend conditions to become part of any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of energy conservation; the protection of, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Important issues that we address include providing appropriate minimum flows and pulse flows in the bypassed reach, temperature control measures in the project reach of the NFFR, protecting amphibians, controlling invasive weeds, protecting threatened and endangered species, providing recreational enhancements, and protecting cultural resources.

Figure 1
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Figure 1. General site location of the Poe Hydroelectric Project within the Feather River Basin. (Source: Staff)

B. NEED FOR POWER

The Poe Project is a resource that is important to the operation of the Feather River system as a whole, contributes to PG&E's resource diversity, and plays a part in meeting the capacity requirements of both PG&E and the state of California.

The Poe Project is one of the downstream-most projects in a series of water resource and hydroelectric projects in the Feather River Basin (figure 1). There are 11 powerhouses licensed to PG&E upstream of the California Department of Water Resource's (CDWR's) Lake Oroville Project (FERC Project No. 2100), which includes hydroelectric generation and a 3.5-million acre-foot storage reservoir. Poe Project operations are integrated with upstream projects that re-regulate the Upper NFFR. These facilities, including Poe, affect flows available for downstream generating facilities.

PG&E operates the project in conjunction with its other generating resources to help meet electricity demands and ancillary service needs of its customers and the state. The Poe Project is in the California-Mexico Power Area (CA/MX) of the Western Electricity Coordinating Council (WECC) within the North American Electric Reliability Council (NERC). NERC annually forecasts electrical supply and demand nationally and regionally for a 10-year period. According to its most recent forecast, hydroelectric generation will only account for 80 MW (1.4 percent) of the projected capacity growth of 5,541 MW in the region between 2004 and 2013 (table 1). If the project ceased generation, the area-wide diversity of the CA/MX would be reduced because the electric output of the project would not be completely replaced by other hydroelectric generation. With the project currently reducing greenhouse gas emissions by 87,000 metric tons of carbon/year compared with fossil-fuel generation, net emissions in the CA/MX would increase over the coming 10-year period if the project ceased to generate electricity.

Peak summer demand and annual energy requirements for the CA/MX are projected to grow at an average of 2.0 and 1.9 percent, respectively, from 2004 to 2013 (table 2). Projected resource summer capacity margins (generating capacity in excess of demand) vary, but overall decrease from 14.6 to 12.7 percent of firm peak demand (http://www.wecc.biz/2004_Summer_Assessment.pdf). With available reserve in the CA/MX projected to decrease below generally accepted values of 15 to 18 percent, generation loss from this project could have a significant effect on the ability of the area to meet regional requirements for generation.

Table 1. Actual and projected generation resources in the CA/MX Power Area. (Source: http://www.wecc.biz/2004_Summer_Assessment.pdf, as modified by staff)

	Resources in 2004 (MW)	Resources in 2013 (MW)	Growth Over Period		Resource Growth as a Percent of Total Growth (%)
			(MW)	(%)	
Hydro - conventional	7,517	7,537	20	0.3	0.4
Hydro- pumped storage	3,840	3,900	60	1.6	1.1
Steam – coal	3,604	2,024	-1,580	-43.8	-28.5
Steam – oil	276	0	-276	-100.0	-5.0
Steam- gas	16,298	14,271	-2,027	-12.4	-36.6
Nuclear	4,450	4,450	0	0.0	0.0
Combustion turbine	6,632	6,451	-181	-2.7	-3.3
Combined cycle	10,569	20,043	9,474	89.6	171.0
Geothermal	2,183	2,183	0	0.0	0.0
Internal combustion	32	32	0	0.0	0.0
Other	1,026	1,077	51	4.9	0.9
Total	56,427	61,968	5,541	9.8	100%

Table 2. Actual and forecasted generation, demand, and reserve capability for CA/MX and WECC. (Source: http://www.wecc.biz/2004_Summer_Assessment.pdf, as modified by staff)

	2004 Actual	2013 Forecasted	Annual Percentage Change
CA/MX			
Existing/planned generation (MW)	56,427	61,968	1.1%
Summer peak demand (MW)	54,881	65,742	2.0%
Winter peak demand (MW)	40,549	49,345	2.2%
Annual energy load (GWh)	297,041	352,517	1.9%
Summer reserve as percentage of firm peak demand	14.6%	12.7%	-
Winter reserve as percentage of firm peak demand	35.1%	22.8%	-
WECC			
Existing/planned generation (MW)	185,949	208,878	1.2%
Summer peak demand (MW)	140,161	171,133	2.2%
Winter peak demand (MW)	124,354	148,827	2.0%
Annual energy load (GWh)	823,958	987,969	2.0%
Summer reserve as percentage of firm peak demand	32.0%	20.9%	-
Winter reserve as percentage of firm peak demand	44.0%	34.3%	-

Due to the Poe Project's effect on and importance to the Feather River system, the lack of projected new hydroelectric resources in the system, and the projected growth in demand and lack of reserve capability in the region, we conclude that power from the project would help meet both short- and long-term needs for power and ancillary services in the CA/MX.

III. PROPOSED ACTION AND ALTERNATIVES

A. APPLICANT'S PROPOSAL

PG&E proposes to continue operating the Poe Project in a peaking mode, although it is proposing to increase minimum flows in the bypassed reach. The project would continue to operate in a base-load mode during periods of high river flow. PG&E proposes no new construction or additional capacity.

1. Project Description

The project consists of (1) the 400-foot-long, 60-foot-tall Poe diversion dam, including four, 50-foot-wide by 41-foot-high radial flood gates, a 20-foot-wide by 7-foot-high small radial gate, and a small skimmer gate that is no longer used; (2) the 53-acre Poe Reservoir; (3) a concrete intake structure located on the shore of Poe reservoir; (4) a pressure tunnel about 19 feet in diameter with a total length of about 33,000 feet; (5) a differential surge chamber located near the downstream end of the tunnel; (6) a steel underground penstock about 1,000 feet long and about 14 feet in diameter; (7) a reinforced concrete powerhouse, 175-feet-long by 114-feet-wide, with two vertical-shaft Francis-type turbines rated at 76,000 horsepower connected to vertical-shaft synchronous generators rated at 79,350 kilovolt-ampere (kVA) for a total authorized installed capacity of 142.83 MW and an average annual generation of 583 GWh; (8) the 370-foot-long, 61-foot tall, concrete gravity Big Bend dam; (9) the 42-acre Poe afterbay reservoir; and (10) a switchyard including two 3-phase 69,000 kVA transformers and two 230-kilovolt (kV) circuit breakers with accompanying equipment. There are no transmission lines as part of the project. Project power is delivered directly to the Rock Creek-Rio Oso No. 1 230-kV transmission line, which loops into the Poe switchyard. Figures 2 and 3 show the major features of the Poe Project.

The Poe Project boundary encompasses 313 acres of land, including 157 acres of applicant-owned land, 144 acres of U.S. Department of Agriculture, Forest Service (Forest Service) land, and 12 acres of private land. The boundary includes Poe reservoir; Poe dam and intake and a short length of river bank below the dam; the footprint of the pressure tunnel; land in the immediate vicinity of tunnel adits 1 and 2; the Poe powerhouse access road; and the land surrounding the Poe powerhouse and switchyard. None of the informal recreational areas in the project vicinity are included within the project boundary, except for the Poe powerhouse beach area.

Figure 2
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Figure 2. Poe Project features in the upstream end of the project area. (Source: PG&E, 2003, as modified by staff)

Figure 3
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Figure 3. Poe Project features in the downstream end of the project area. (Source: PG&E, 2003, as modified by staff)

PG&E proposes to expand the project boundary by 42 acres by incorporating Big Bend dam and reservoir (up to the current project boundary downstream of the powerhouse tailrace) into the Poe Project boundary. Big Bend dam and part of the reservoir are currently within the boundary of the downstream Oroville Project.

2. Project Safety

The project has been operating for more than 47 years under the existing license, and, during this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

3. Project Operation

The Poe Project is operated in conjunction with other PG&E projects on the Upper NFFR (Upper NFFR Project, FERC Project No. 2105; Rock Creek-Cresta Project, FERC Project No. 1962; and Bucks Creek Project, FERC Project No. 619), to maximize generation benefits for the system. During dry and average water years, the project is operated in a peaking mode, with generation varying on an hourly basis from zero to maximum powerhouse capacity, although it operates near its most efficient load if possible. During high-flow periods, PG&E operates the project at maximum capacity to minimize spill at the Poe dam, but during severe floods (more than 45,000 cubic feet per second [cfs]), the project is shut down, and all flow is spilled at the dam. The project's maximum hydraulic capacity under normal operation is 3,700 cfs, with both units operating. The normal daily reservoir fluctuation is about 3 feet, but on a seasonal basis, the reservoir may fluctuate nearly 10 feet, from a maximum elevation of 1,389.8 feet (U.S. Geological Survey [USGS] datum) to elevation 1,380.2 feet.

With the exception of the current minimum flow of 50 cfs released from Poe dam, flow from the NFFR (Poe reservoir) is diverted at Poe dam into the adjoining intake structure, and from there into a 19-foot-diameter, 33,000-foot-long pressure tunnel. The tunnel transitions into a 14-foot-diameter, 1,000-foot-long steel penstock, from which flow is distributed to the two turbine-generators (located in the Poe powerhouse), each of which has a maximum hydraulic capacity of 1,850 cfs. Flow from both units is

discharged into the powerhouse tailrace and from there into the Big Bend reservoir, which serves as the afterbay for the Poe powerhouse.

4. Proposed Environmental Measures

PG&E proposes to continue operating the Poe Project as it has done under its current license, but it is proposing additional protection, mitigation, and enhancement (environmental) measures, as part of the application. Environmental measures proposed include:

- Increase the minimum flow in the bypassed reach of the NFFR below Poe dam from 50 to 150 cfs, as measured at PG&E stream gage NF23 about 1.6 miles downstream of Poe dam, and monitor the effects of the higher minimum flow on water temperature, fishery resources, bald eagle usage, and on the foothill yellow-legged frog (FYLF), a U.S. Forest Service (Forest Service) sensitive species.
- Continue the operation and maintenance of PG&E stream gage NF23 for the measurement of minimum flows below Poe dam, and discontinue the use of PG&E stream gage NF66, a staff gage immediately below Poe dam.
- At spill flows below 3,000 cfs, implement ramping rates for spillway operations at Poe dam, as follows: March/April/May – 250 cfs/hour up-ramp, 150 cfs/hour down-ramp; June 1-15 – 300 cfs/hour up-ramp, 150 cfs/hour down-ramp; June 16 to February 28 – 400 cfs/hour up-ramp, 150 cfs/hour down-ramp.
- Protect special status plants by managing existing recreational use and implementing noxious weed control.
- Conduct surveys for sensitive wildlife species and coordinate with resource agencies for protection of these species if additional activities that could affect sensitive species should occur in the project area.
- Within 1 year of license issuance, improve an existing trail running from the west end of the informal parking area at Cresta powerhouse to a small sandy beach located on Poe reservoir and install and maintain informational, regulatory, and directional signs at the site.
- Provide recreational improvements at Sandy Beach, including a portable toilet and garbage facilities, additional signage, re-gravelling the existing road, and trimming vegetation.
- Provide recreational improvements at Bardee’s Bar, including a permanent picnic table, trash receptacle, vault toilet, and additional signage, with “pack-it-in/pack-it-out” policy.

- Provide recreational improvements at Poe Beach, including better site access (stairs or trail) and additional signage, with “pack-it-in/pack-it-out” policy.
- Provide recreational improvements at Poe powerhouse, including a permanent vault toilet, garbage facilities, additional parking along the road to the beach, and additional signage.
- Provide recreational improvements at Shady Rest, including an Americans with Disabilities Act-accessible trail to the river (developed with the Forest Service), and rehabilitation of existing facilities when necessary.¹
- Provide recreational improvements at Poe reservoir, including an improved trail from the Cresta powerhouse access road to the reservoir, and additional signage, with “pack-it-in/pack-it-out” policy.
- Improve an existing scenic viewpoint on Highway 70, if acceptable to California Department of Transportation (Caltrans), and provide additional signage.
- Provide a one-time contribution of seed money to a government agency or non-profit organization for possible development of a visitor center.
- To enhance visual resources, conduct minor painting at Poe dam, remove the steel bridge at Bardee’s Bar, initiate revegetation of the Bardee’s Bar spoil pile, and implement erosion control measures at the toe of the spoil pile near the NFFR.
- Monitor two archaeological sites (CA-BUT-42H and CA-BUT-1665) after the recreation season each fall for 5 years.

B. STAFF’S MODIFICATION OF THE APPLICANT’S PROPOSAL

Staff’s modifications to the applicant’s proposal include the following modifications and additional measures:

- Release the following minimum instream flows, as measured at the Pulga gage (NF23, USGS No. 11404500) about 1.6 miles downstream of Poe dam:

Month	Wet Year (cfs)	Normal Year (cfs)	Dry Year (cfs)	Critically Dry Year (cfs)
October	200	200	150	150
November	215	200	150	150

¹Shady Rest is a roadside rest area located within the project boundary for the upstream Rock Creek-Cresta Project, and any improvements there would need to be made in the context of that project. Consequently, we do not address this proposed measure in this final EA.

Month	Wet Year (cfs)	Normal Year (cfs)	Dry Year (cfs)	Critically Dry Year (cfs)
December	225	225	165	150
January	250	225	165	150
February	250	225	190	190
March	250	225	215	210
April	275	250	215	210
May	300	275	200	200
June	250	225	180	180
July	225	200	180	165
August	225	200	180	165
September	225	200	165	165

- As an interim measure, release a single 24-hour, 2,000-cfs pulse flow by February 15 in water years classified as dry or critically dry, if a natural or project-related release of the same magnitude has not occurred in the preceding 18 months. Licensee would ramp-up to 2,000 cfs through the implementation of staff-recommended ramping rates, hold the pulse flow for a period of 24 hours, and then ramp-down at the recommended rate. Upon completion of the recommended pulse flow study (see below), the interim pulse flow could be modified accordingly, if study results indicate that a change is appropriate. Total duration of an individual interim pulse flow event would be approximately 41 hours, including ramping.
- Within 1 year of license issuance, prepare, in consultation with the resource agencies, and file with the Commission for approval, a pulse flow monitoring plan, in accordance with Forest Service final 4(e) condition no. 24(2)(B) to evaluate the movement of organic and fine-grained materials in the Poe reach during pulse flows. The study would be designed to identify the appropriate magnitude and duration of pulse flows needed to effectively remove fine-grained sediments and organic materials from spawning gravels. Long-term monitoring would include provisions for possible modifications to the pulse flow schedule depending on the study results, after implementation of the first three pulse flow events.
- Within 1 year of license issuance, prepare, in consultation with the resource agencies, and file with the Commission for approval, a ramping rate plan, schedule, and effectiveness monitoring plan. The ramping rate plan should consider the 5th year Rock Creek-Cresta Project ramping rate report that is due in May 2007, and address the operational and equipment issues at the Rock Creek-Cresta dam that currently limit the control of Poe Project ramping rates.

- In the interim, until the ramping rate plan and schedule are developed and ramping rate controls at Rock Creek-Cresta dam are addressed, PG&E shall implement ramping rates for spillway operations at Poe dam as follows: 250 cfs/hour up-ramp from March 1 through September 30 to protect breeding FYLF, egg masses, tadpoles, frog metamorphs,² and juvenile frogs; 400 cfs/hour up-ramp from October 1 through February; and down-ramp of 150 cfs/hour year-round. These interim ramping rates would be implemented at all Poe dam spillway flows under PG&E's control, or below about 3,000 cfs.
- Develop a streamflow gaging management plan for the Pulga gage (NF23; USGS No. 11404500) in consultation with the resource agencies, and file the plan with the Commission for approval. Operate and maintain the Pulga gage, implement the streamflow gaging management plan, and forecast the water year type.
- Prepare and implement a Poe bypassed reach water temperature monitoring plan to evaluate changes in temperature resulting from new minimum instream flows and to monitor water temperatures of the inflow to the Poe Project. The plan would be prepared in consultation with the resources agencies, filed with the Commission for approval, and consist of continuous temperature monitoring from June 1 through September 30 for the 3 years following issuance of a new license, provision of monitoring results to the resource agencies and the Commission on a timely basis, and an annual report to be submitted by October 31. The plan would include provisions for possible modification of the monitoring program after the completion of the first 3 years of monitoring, and, depending on the monitoring results, changes in the instream flow releases in the reach, if such changes would result in beneficial reductions in water temperatures. At the completion of the 3-year monitoring program, and following implementation of any operational changes, PG&E would continue to monitor water temperature in the bypassed reach for the duration of the license term.
- Within 1 year of license issuance, prepare in consultation with the resource agencies and file with the Commission for approval, a Poe bypassed reach fisheries monitoring plan. Monitoring would be conducted separately from any related macroinvertebrate and amphibian studies that are ordered as conditions of a license. Consecutive annual monitoring in the Poe bypassed reach for fish would begin in years 4 and 5 after license issuance, and continue as such in 5-year intervals for the duration of the license term. Annual reports would be required within 6 months following completion of each study, and would compare, contrast, and summarize results from previous monitoring.

²A metamorph is the life stage during metamorphosis from tadpole to adult frog.

The plan would include provisions for possible modification to the flow regime if the results indicate that such a modification is necessary. Specific thresholds and criteria for evaluating the response of biotic communities to license conditions would be developed and included in the study plan, after consultation with the resource agencies. The plan would include specific objectives and criteria/decision points for determining whether the objectives are met, including wild trout age class, average size (length and weight), length-frequency distribution, total biomass (pounds/acre), harvestable component, and angler catch rate (including catch and release).

- Within 1 year of license issuance, and in consultation with the resource agencies, prepare and file with the Commission for approval, a plan to evaluate the effects of project operations on outmigrating juvenile rainbow trout from Flea Valley Creek and Mill Creek, and the accessibility of these tributaries as coldwater refugia for adult or sub-adult rainbow trout during the summer months. The applicant's plan and subsequent evaluation would include an assessment of hydrologic connectivity between the NFFR and Flea Valley Creek and Mill Creek during the summer and fall months (July through October) under any new license conditions. The applicant's plan would also include provisions for long-term monitoring to assess whether geomorphic stream alterations (e.g., gravel deposition) adversely affects tributary access. Long-term monitoring of tributary access for rainbow trout would be done in conjunction with other monitoring efforts required by the Commission (e.g., fisheries, amphibians, and macroinvertebrates). The applicant would consult with the Forest Service, California Department of Fish and Game (Cal Fish and Game), U.S. Department of the Interior (Interior), and other interested parties by January 31 after each study period to review study results. If, after review and consultation, the applicant and the resource agencies determine that project operations are adversely affecting the outmigration of juvenile rainbow trout, or adult or sub-adult rainbow trout access to coldwater refuge habitat during the summer months, the applicant would develop modifications to project operations or other measures to ensure fish accessibility to these tributary streams.
- Within 1 year of license issuance, prepare a Poe bypassed reach benthic macroinvertebrate monitoring plan. The plan would be prepared in consultation with the resources agencies, and be filed with the Commission for approval. The plan would include specific objectives and criteria/decision points for determining whether the objectives are met, including biodiversity, total biomass, species richness, and condition of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Tricoptera (caddisflies) (EPT). Monitoring in the Poe bypassed reach would begin in years 4 and 5 after license issuance. After the initial 2-year monitoring period, two consecutive annual surveys would be implemented every 5 years for the remainder of the license to evaluate long-

term responses to measures implemented in the new license, and any subsequent modifications to project operations. Macroinvertebrate surveys would be conducted during late summer/fall and be coordinated with the fish and amphibian monitoring studies, but would be separate from those studies to avoid compromising the results. Annual reports would be required within 6 months following completion of monitoring, and would compare, contrast, and summarize results from previous monitoring studies. The plan would include provisions for possible modification of the flow regime depending on the monitoring study results.

- Develop and implement an amphibian monitoring plan, to be developed in consultation with the agencies and filed with the Commission for approval. The plan would include annual surveys for the duration of the license, to determine the long-term effects from changes in minimum flows on breeding FYLF frogs, frog egg masses, tadpoles, and frog metamorphs. Monitoring would be conducted separately from fisheries and macroinvertebrate monitoring to avoid compromising the results. The plan would include a requirement for regular reporting to the resource agencies and the Commission, and include provisions for possible modification of the flow regime depending on the monitoring study results.
- Every 6th year after license issuance for the term of the license, file with the Commission, an instream flow effects monitoring report to comprehensively describe and summarize the results of all monitoring activities associated with project minimum flows. These reports would summarize all monitoring activities associated with project minimum flows conducted since the issuance of the license or since the previous instream flow effects monitoring report. During preparation of the report, consult with the resource agencies to review results and assess conditions pertaining to the biotic community and abiotic riverine characteristics in response to project operations. If, after review, the resource agencies determine that aquatic species or other ecological attributes may benefit from modifications to the minimum instream flows required by the license, then the applicant and the resource agencies would evaluate and determine whether such instream flow modifications: (1) can be implemented within the applicant's operational capabilities; (2) would maintain the total annual volume of water that has been allocated for minimum instream flows in any given water year, and (3) would not adversely affect other beneficial uses, including hydroelectric power generation and recreation. Any new instream flow recommendation made by the applicant in consultation with the resource agencies would be filed with the Commission for approval at the same time as the filing of the instream flow effects monitoring report. This 6-year report would be supplemented by annual reports that would provide monitoring and study results occurring in years that the 6-year report is not prepared.

- Annually review the list of special status species and consult with the Forest Service to determine if study plans are needed for newly listed species, and survey areas within National Forest System lands in the project area directly affected by project operations to determine possible project effects on newly listed species.
- Develop, file with the Commission for approval, and implement a noxious weed management plan for control of noxious weeds on project lands related to project activities.
- Develop, file with the Commission for approval, and implement a riparian monitoring plan, including surveys in years 1-4 and at sampling intervals thereafter to be determined during development of the plan, to determine the effects on riparian vegetation from changes in instream flows.
- Within 6 months of license issuance, update, file with the Commission for approval, and implement the Bald Eagle Management Plan for the Poe powerhouse nesting territory.
- Within 1 year of license issuance, prepare a recreation management plan in consultation with appropriate federal, state, and local agencies (including, but not necessarily limited to, the Forest Service; U.S. Fish and Wildlife Service [FWS]; National Oceanographic and Atmospheric Administration, National Marine Fisheries Service [NMFS]; the California State Water Resources Control Board [Water Board]; Cal Fish and Game; California Department of Boating and Waterways [CDBW]; and Butte County) and file with the Commission for approval. The plan would provide for monitoring recreational visitor use at Sandy Beach, Bardee's Bar, Poe Beach, and the Poe powerhouse to assess use levels to determine if additional facilities are needed.
- Conduct a feasibility study on improving an existing abandoned trail between Bardee's Bar and the Poe powerhouse road and compare the results of this study with the information provided in PG&E's September 2006 feasibility report on modifying the abandoned construction road for use as a trail; and develop an all-weather hiking trail in one of the two locations, based on the results of the study.
- Implement measures to improve and protect public access for angling, such as additional public parking, public rest rooms, and public hiking trails to allow anglers to safely access the NFFR.
- Within 1 year of license issuance, provide stream flow information from gage NF23 (USGS gage 11404500) on the NFFR to the public, via a toll-free phone number and/or via the Internet.

- Within 1 year of license issuance, prepare a road management plan and file with the Commission for approval.
- Within 1 year of license issuance, prepare a fire prevention and response plan and a fuel treatment plan for lands within the project boundary and file with the Commission for approval.
- Within 1 year of license issuance, prepare a Bardee's Bar tunnel spoil pile revegetation plan and file with the Commission for approval.
- Within 1 year of license issuance, prepare a visual management plan and file with the Commission for approval.
- Within 6 months of license issuance, prepare a final Historic Properties Management Plan (HPMP) in consultation with appropriate federal, state and local agencies and file with the Commission for approval.

C. NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

D. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

We eliminated the following alternatives from detailed analysis in the final EA.

1. Federal Government Takeover

We do not consider federal takeover to be a reasonable alternative. Federal takeover of the Poe Project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is currently no evidence showing that a federal takeover should be recommended to Congress. No party has suggested that federal takeover would be appropriate, and no federal agency has expressed an interest in operating the Poe Project.

2. Nonpower License

A nonpower license is a temporary license the Commission would terminate whenever it determines that another governmental agency is authorized and willing to assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. At this time, no governmental agency has suggested a willingness or

ability to take over the project. No party has sought a nonpower license, and we have no basis for concluding that the Poe Project should no longer be used to produce power. Thus, we do not consider a nonpower license a reasonable alternative.

3. Project Retirement

Retiring the project would require denying PG&E's license application and the surrender and termination of the existing license, with any necessary conditions. The project would no longer be authorized to generate power, which has averaged about 583 GWh of electricity annually, and project facilities would be removed. There would be significant costs involved with retiring the project and/or removing the project facilities. Finally, retirement would foreclose any opportunity to add environmental enhancements or recreational facilities/opportunities to the existing project. In addition, no party has recommended project retirement. For these reasons we do not consider project retirement to be a reasonable alternative.

IV. CONSULTATION AND COMPLIANCE

The Commission's regulations (18 CFR, sections 4.38 and 16.8) require that applicants consult with appropriate resource agencies and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

A. SCOPING

Before preparing the draft EA, we issued Scoping Document 1 (SD1) on March 4, 2004, and conducted two scoping meetings to identify potential issues associated with the Poe Project on March 31 and April 1, 2004, in Oroville, California. The scoping meetings and site visit were noticed in a local newspaper and in the Federal Register. Based on the number of completed registration forms, 12 individuals, exclusive of Commission staff, attended the March 31 evening scoping meeting, and 8 individuals, exclusive of Commission staff, attended the April 1 morning scoping meeting. We also held a site visit to the Poe Project facilities and surrounding environment on March 31, 2004, which was attended by most of the individuals who also attended the March 31 scoping meeting.

In addition to oral comments received at the scoping meetings, the following agencies, representatives, individuals, and non-governmental organizations (NGOs) filed written comments on SD1.

Entity	Date of Filing
California State Water Resources Control Board	April 19, 2004
American Whitewater, Chico Paddleheads, and Shasta Paddlers	April 28, 2004
U.S. Fish and Wildlife Service	April 29, 2004
California Department of Fish and Game	May 3, 2004
Butte County	May 3, 2004
The Baiocchi Family	June 2, 2004

We revised SD1 following the scoping meetings and our review of written comments filed during the scoping comment period. Scoping Document 2 (SD2) was issued on March 16, 2005, and presented our view of issues and alternatives to be considered in the EA.

B. INTERVENTIONS AND COMMENTS

On March 24, 2004, the Commission issued a public notice accepting the application and soliciting motions to intervene. On February 8, 2005, the Commission issued a notice that the application was ready for environmental analysis (REA notice) and requesting comments, recommendations, prescriptions, and terms and conditions by April 11, 2005. The following entities filed motions to intervene in response to the acceptance notice and REA notice.

Entity	Date of Filing
American Whitewater Affiliation, Chico Paddleheads and Shasta Paddlers	April 28, 2004
U.S. Department of Agriculture – Forest Service	May 10, 2004
U.S. Department of the Interior	May 21, 2004
NMFS	May 24, 2004
California Department of Water Resources	May 24, 2004
Butte County	June 14, 2004
County of Plumas and Plumas County Flood Control and Water Conservation District*	September 8, 2004
California State Water Resources Control Board	March 23, 2005
California Department of Fish and Game	April 8, 2005

Entity	Date of Filing
State Water Contractors	April 8, 2005
The Anglers Committee	April 11, 2005
Michael F. Taylor**	September 14, 2006

* Motion to intervene out of time. Granted by the Commission on April 20, 2005.

**Motion to intervene out of time. Granted by the Commission on March 23, 2007.

The following entities filed comments, recommendations and terms and conditions in response to the REA notice.

Entity	Date of Filing
California State Water Resources Control Board	March 23, 2005
U.S. Department of the Interior	March 31, 2005
U.S. Department of Agriculture – Forest Service	April 6, 2005
California Department of Fish and Game	April 8, 2005
State Water Contractors	April 8, 2005
NMFS	April 11, 2005
The Anglers Committee	April 11, 2005
Butte County	April 11, 2005
American Whitewater Affiliation, Chico Paddleheads and Shasta Paddlers	April 11, 2005

PG&E filed reply comments to the terms and conditions filed by other entities, by letter dated May 23, 2005.

C. DRAFT ENVIRONMENTAL ASSESSMENT

The draft EA was issued for public comment on August 2, 2006. The following entities filed letters of comment on the draft EA.

Entity	Date of Filing
Plumas County and Plumas County Flood Control and Water Conservation District	September 13, 2006
Michael F. Taylor	September 14, 2006

Entity	Date of Filing
Pacific Gas and Electric Company	September 15, 2006
U.S. Fish and Wildlife Service	September 15, 2006
National Park Service	September 15, 2006
California State Water Resources Control Board	September 15, 2006
California Department of Fish and Game	September 15, 2006
California Sportfishing Protection Alliance	September 15, 2006
California Department of Water Resources	September 18, 2006
Chico Paddleheads and several individuals	September 18, 2006
Butte County and American Whitewater Affiliation	September 18, 2006
U.S. Department of Agriculture – Forest Service	September 29, 2006

We include a summary of these comments and our responses to them in appendix C of this final EA.

D. STATUTORY REQUIREMENTS

1. Water Quality Certification

Section 401(a)(1) of the Clean Water Act and Commission regulations require that license applicants obtain either (1) state certification that any discharge from the project would comply with applicable provisions of the Clean Water Act; or (2) a waiver of certification by the appropriate agency. On February 18, 2005, PG&E applied to the Water Board for water quality certification (WQC) for the Poe Project. On January 31, 2006, and January 19, 2007, PG&E withdrew and re-filed its application for WQC. The Water Board acknowledged receipt of the January 2007 PG&E request by letter dated February 23, 2006, and stated that receipt of the request initiated a 1-year time clock for the Water Board to act on the request for WQC.

2. Coastal Zone Management

Section 307(c)(3) of the Coastal Zone Management Act requires that all federally licensed and permitted activities be consistent with approved state Coastal Zone Management Programs.³ If a project is located within a coastal zone boundary or if a project affects a resource located in the boundaries of the designated coastal zone, the applicant must certify that the project is consistent with the state Coastal Zone Management Program.

³16 U.S.C. §1456(c)(3)(A).

The Poe Project is located outside of the designated coastal zone of the California Coastal Commission.

3. Section 18 Prescription

Section 18 of the Federal Power Act (FPA) provides that the Commission must require a licensee to construct, operate, and maintain such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate. Interior did not provide a fishway prescription for the Poe Project, but by letter dated March 30, 2005, they reserved their authority to prescribe the construction, operation, and maintenance of fishways at the project at a later date (letter from W. Taylor, Director, Office of Environmental Policy and Compliance, Department of Interior, Washington, DC, to M.R. Salas, Secretary, FERC, Washington, DC, March 30, 2005).

By letter dated April 8, 2005, NMFS filed its preliminary fishway prescription for the Poe Project, stating that when notified by NMFS, PG&E must provide funding to support trap-and-haul passage of anadromous species through or around the Poe Project, and that PG&E must coordinate with NMFS, other agencies, and other licensees in the Feather River watershed to provide protection, mitigation, and enhancement of anadromous species in the basin (letter from R. McGinnis, Regional Administrator, NMFS, Sacramento, CA, to M.R. Salas, Secretary, FERC, Washington, DC, April 8, 2005). By letter dated December 12, 2005, NMFS filed a request to amend its prescription for the Poe Project, by withdrawing its prescription for funding and coordination. NMFS withdrew its fishway prescription based on negotiations that are currently underway between NMFS, PG&E, and CDWR, licensee for the Oroville Project (FERC No. 2100) involving a Habitat Expansion Agreement (HEA), which would address fish passage issues in the Feather River Basin, including the North Fork Feather River. A draft of this agreement was included as an appendix to the Oroville Relicensing Settlement Agreement, filed with the Commission on March 24, 2006. Because the HEA is not final however, NMFS has reserved their authority to prescribe fishways for the Poe Project (letter from R. McGinnis, Regional Administrator, NMFS, Long Beach, CA, to M.R. Salas, Secretary, FERC, Washington, DC, November 15, 2006).

4. Endangered Species Act

Section 7 of the ESA, 16 U.S.C. §1536(a), requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of any designated critical habitat of such species. Federal agencies are required to consult with FWS when a proposed action may adversely affect listed species.

The federally listed (threatened) bald eagle occurs in the project area, with an active and successful nest located across the NFFR from the Poe powerhouse. The

project area also falls within the range of the threatened valley elderberry longhorn beetle (VELB) and the threatened California red-legged frog (CRLF). The project is not located within the proposed critical habitat for the CRLF, and habitat in the project area is generally unsuitable for the VELB and CRLF. Surveys in the area did not find either of these species. Thus, as discussed in section V.C.4, *Threatened and Endangered Species*, continued operation of the Poe Project would have no effect on the VELB, would not be likely to adversely affect the CRLF, and would be likely to adversely affect the bald eagle. On October 24, 2006, we requested concurrence from FWS on our finding for the CRLF and requested formal consultation regarding the bald eagle. FWS indicated that since delisting of the bald eagle would be occurring in the near future, they would not be preparing a biological opinion.

5. Section 4(e) Conditions

a. Preliminary Section 4(e) Conditions:

The Forest Service filed preliminary section 4(e) terms and conditions for the Poe Project on April 6, 2005. PG&E filed reply comments on the Forest Service preliminary section 4(e) conditions on May 23, 2005. The preliminary 4(e) conditions are summarized as follows:

- Condition nos. 1 through 23, *Standard Conditions*—These are standard Forest Service administrative provisions covering a range of measures to ensure protection and use of National Forest resources affected by the project.
- Condition no. 24(1), (2), (4) and (5), *Streamflow*- Requires the licensee to maintain specified minimum streamflows and release pulse flows below Poe dam in accordance with table A-1, maintain stream gage NF23 (USGS No. 11404500) near Pulga, and implement ramping rates below Poe dam.
- Condition no. 25, *Water Year Type*- Requires the licensee to make a forecast of the water year type (wet, normal, dry, critically dry) on or about January 10, February 10, March 10, April 10, and May 10, and notify the Commission and other federal and state agencies.
- Condition no. 26, *Multiple Dry Water Years*- Requires the licensee to notify the state and federal agencies of licensee's plans to manage drought conditions, by March 10 of the second or subsequent dry or critically dry water year and the year following the end of a sequence of dry or critically dry water years.
- Condition no. 27, *Tributary Access*- Requires the licensee to prepare a tributary access plan in consultation with the resource agencies, which would include an evaluation of access by trout to tributaries, and providing results of monitoring and any barrier removal recommendations to the resource agencies and the Commission.

- Condition no. 28, *Poe Reach Biological Monitoring*- Requires the licensee, within 1 year of license issuance, and after consultation with the resource agencies, to file with the Commission a fish population, benthic macroinvertebrate, and amphibian monitoring plan approved by the Forest Service. The plan would outline sampling intervals and data to be collected in the Poe bypassed reach, and would include provisions for providing the results to the resource agencies and for modifying the instream flows based on the monitoring results.
- Condition no. 29, *Recreation*- Requires the licensee to prepare a Recreation Enhancement, Construction, and Implementation Plan outlining the project specific construction details and schedule for recreation improvements at Sandy and Poe beaches. Recommendations for improvements at other facilities were made under section 10(a).
- Condition no. 30, *River Ranger* - Requires that the licensee provide to the Forest Service \$12,000 (escalated dollars) to assist in funding a “River Ranger” position. The purpose of this position would be to provide additional light maintenance, visitor information/assistance, user safety, collect information on recreation facility use, conduct user surveys, make use counts, and provide other Forest Protection Officer duties in the project bypassed reach and nearby reaches.
- Condition no. 31, *River Flow Information* - Requires the licensee to make information on streamflow at North Fork Feather River gage NF-23 available to the public via toll-free phone and/or the Internet.
- Condition no. 32, *Fuel Treatment Plan* - Requires the licensee to file with the Commission a Fuel Treatment Plan, approved by the Forest Service, for the purpose of identifying hazardous vegetative conditions surrounding project facilities that may accelerate the spread of a wildfire onto National Forest System (NFS) lands as a result of licensee activities or might place project facilities in jeopardy from an approaching fire.
- Condition no. 33, *Revegetation of the Bardee’s Bar Tunnel Spoil Pile* - Requires the licensee to file with the Commission a Bardee’s Bar tunnel spoil revegetation plan, approved by the Forest Service, for the purpose of identifying measures to be taken to revegetate the spoil pile.
- Condition no. 34, *Heritage Resources* - Requires the licensee to file with the Commission, a Heritage Properties Management Plan⁴ approved by the Forest Service for the purpose of protecting and interpreting heritage resources. The

⁴The Forest Service Heritage Properties Management Plan is what we refer to as the HPMP throughout this document.

HPMP will be incorporated into the programmatic agreement (PA) of which the Forest Service will be a signatory.

- Condition no. 35, *Special Status Species* - Requires the licensee to annually review the current list of special status plant and wildlife species (species that are federally listed as Endangered or Threatened, Forest Service listed as Sensitive, or on the Plumas National Forest Watch List) that might occur within the project boundary. If a new species is added and if the Forest Service determines that the species is likely to occur, the licensee must develop and implement a study plan in consultation with the Forest Service to reasonably assess the effects of the project on the species. In addition, areas within the project boundary that have suitable habitat or known occurrences of selected special status wildlife or plant species must be resurveyed every 10 years to (a) determine if special status plant or wildlife species have changed in location (i.e., migrated into or moved within the project boundary), and (b) monitor for impacts caused by ongoing project activities.
- Condition no. 36, *Protection of Threatened, Endangered, Proposed for Listing and Sensitive Species*- Requires the licensee to prepare a biological evaluation of the potential impact of any new project features located on NFS lands that may affect any listed species or its habitat, and submit it to the Forest Service for approval.
- Condition no. 37, *Invasive Weed Management Plan* - Requires the licensee to file with the Commission an Invasive Weed Management Plan, approved by the Forest Service, for the purpose of controlling and containing the spread of project-related invasive weeds on licensee and NFS lands, which might be related to the licensee's activities.
- Condition no. 38, *Bald Eagle Management Plan* - Requires the licensee to review and update the existing Bald Eagle Management Plan for the project area.
- Condition no. 39, *Land Management and Visual Resource Protection* - Requires the licensee, within 60 days prior to any ground-disturbing activity on NFS lands, to file with the Commission a Visual Management Plan approved by the Forest Service.
- Condition no. 40, *Road Management Plan* - Requires the licensee, within 1 year after license issuance, to file with the Commission a Road Management Plan approved by the Forest Service. As an alternative to preparing a Road Management Plan, the licensee may request that the Forest Service incorporate project roads located on NFS lands into the existing Forest Service and Licensee Road Use Agreement dated May 22, 1997. If the request is accepted by the Forest Service, the licensee shall file the Road Use Agreement with the Commission in lieu of the Road Management Plan.

b. Alternative Section 4(e) Conditions under the Energy Policy Act of 2005:

On December 19, 2005, the Commission received a copy of PG&E's filing to the Forest Service proposing alternative 4(e) conditions in response to the Forest Service's April 6, 2005 preliminary 4(e) conditions and seeking a trial-type hearing to resolve disputed issues of material fact with respect to certain Forest Service 4(e) conditions (letter filed by J.A. Whitaker, Attorney for PG&E, Winston and Strawn, LLP, Washington, DC, to M.R. Salas, Secretary, FERC, Washington, DC) pursuant to §33 of the FPA (as amended by §231 of the Energy Policy Act of 2005) and 7 CFR §§1.604. The rules establishing the trial-type hearing and consideration of alternative conditions and prescriptions submitted by any party to a license proceeding implement section 241 of the Energy Policy Act of 2005 and are contained in Resource Agency Procedures for Conditions and Prescriptions in Hydropower Licenses: Interim Final Rule.⁵

In its filing with the Forest Service, PG&E submitted alternative 4(e) conditions in response to the following conditions:

- Condition No. 3 – Approval of Changes
- Condition No. 5 – Surrender of Licenses or Transfer of Ownership
- Condition No. 8 – Fire Protection, Response, and Investigation
- Condition No. 9 – Road Use by Government
- Condition No. 10 – Road Use
- Condition No. 16 – Compliance with Regulations
- Condition No. 18 – Indemnification
- Condition No. 19 – Surveys, Land Corners
- Condition No. 20 – Damage to Land, Property, and Interests of the United States
- Condition No. 21 – Risks and Hazards
- Condition No. 24(1) - Streamflow
- Condition No. 27 – Tributary Access
- Condition No. 35 – Special Status Species
- Condition No. 37 – Invasive Weed Management Plan.

⁵70 CFR 69,808 issued on November 17, 2005, jointly by the U.S. Department of Agriculture, the U.S. Department of the Interior, and the U.S. Department of Commerce (NMFS).

Alternative conditions 3 through 21 were in response to the Forest Service Standard Conditions and are not discussed in this final EA. However, we specifically discuss alternative conditions nos. 8, 24(1), 27, 35, and 37.

PG&E's request for administrative hearing on material issues of disputed fact was associated with the following 4(e) conditions required by the Forest Service:

- Condition No. 24(3) – Although this was filed as a Forest Service recommendation under section 10(a), PG&E included this condition in its request for hearing, disputing certain facts supporting the recommendation that PG&E provide additional flows for water temperature modification within 24 hours of exceeding a water temperature threshold of $\geq 1^{\circ}\text{C}$ in the bypassed reach, including the Forest Service statement that the foothill yellow-legged frog (FYLF) may be more adaptable to flow changes than originally believed; and that PG&E provide feasibility studies on measures that could be used to reduce and maintain water temperatures in the Poe bypassed reach.
- Condition No. 27 – PG&E disputed certain facts supporting the requirement that PG&E conduct a tributary access survey for rainbow trout, and implement access during the spawning and low-flow seasons.
- Condition No. 37 – PG&E disputed certain facts supporting the requirement that PG&E control and eradicate “project-related invasive weeds” over a large area, including Forest Service lands and PG&E “private lands,” within 12 months after detection; that PG&E prepare a schedule for eradication of all A, B, and Q invasive weed species and other rated invasive species as designated by other agencies in the area affected by the project; and that PG&E control and eradicate any invasive weeds that “might be related” to PG&E activities and that are project related.

The outcome of the Energy Policy Act of 2005 proceeding is summarized below.

c. Final Section 4(e) Conditions:

By letter dated September 26, 2006, the Forest Service filed with the Commission 11 final section 4(e) conditions that it indicated had been mutually agreed to with PG&E and that should replace preliminary section 4(e) conditions filed by the Forest Service on April 6, 2005. These agreed-to final conditions included:

- Condition No. 3 – Approval of Changes
- Condition No. 5 – Surrender of Licenses or Transfer of Ownership
- Condition No. 8 – Fire Protection, Response, and Investigation
- Condition No. 9 – Access By The United States (formerly entitled “Road Use by Government”)

- Condition No. 10 – Road Use
- Condition No. 16 – Compliance with Regulations
- Condition No. 19 – Surveys, Land Corners
- Condition No. 21 – Risks and Hazards
- Condition No. 24 – Streamflow (Part 6 added on “Tributary Access,” formerly Condition No. 27)
- Condition No. 35 – Special Status Species
- Condition No. 37 – Invasive Weed Management Plan.

On September 29, 2006, PG&E notified the Forest Service and the Commission by letter that as a result of the settlement discussions and agreement reached on final section 4(e) conditions with the Forest Service, it was withdrawing its request for an administrative hearing regarding preliminary section 4(e) conditions filed by the Forest Service, and also withdrawing PG&E’s alternative section 4(e) conditions, except for conditions No. 18 and 20, which were still under discussion.

On November 30, 2006, the Forest Service filed with the Commission the two remaining final section 4(e) conditions that had been the subject of PG&E’s filing under the Energy Policy Act of 2005, and that had now been mutually agreed to by PG&E and the Forest Service. These two conditions were Condition No. 18 (Indemnification), and Condition No. 20 (Damage to Land, Property, and Interests of the United States). On December 5, 2006, PG&E notified the Forest Service and the Commission by letter that as a result of the agreement reached on final section 4(e) conditions No. 18 and 20 with the Forest Service, it was withdrawing its alternative section 4(e) conditions for conditions No. 18 and 20.

A copy of the preliminary section 4(e) conditions filed by the Forest Service on April 6, 2005, and the final conditions filed by the Forest Service on September 26 and November 30, 2006, is included as appendix A to this final EA. The Forest Service has also indicated that any remaining final section 4(e) conditions will be filed within 60 days of the date of the issuance of the final EA.

6. Section 106 Consultation

License issuance is considered an undertaking within the meaning of section 106 of the NHPA of 1966, as amended.⁶ Section 106 requires that every federal agency “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and

⁶Public Law 89-665; 16 U.S.C. 470.

objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

As described further in section V.C.7, *Cultural Resources*, to meet the requirements of section 106, the Commission will execute a PA for the protection of historic properties from the effects of the continued operation of the Poe Project. The terms of the PA would ensure that PG&E addresses and treats all historic properties identified within the project area through an HPMP. The HPMP entails on-going consultation involving historic properties for the term for the license. On January 12, 2006, we issued our draft PA, which describes how historic properties will be managed under any new license issued for the project, for comment.

7. Essential Fish Habitat

Under the Magnuson-Stevens Fishery Conservation and Management Act, as amended (Act), the United States Congress mandated that habitats essential to federally managed commercial fish species be identified, and that measures be taken to conserve and enhance their habitat (Public Law 104-297). In the amended Act, Congress defined essential fish habitat (EFH) for federally managed fish species as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH is applicable to federally managed commercial species that live out at least one component of their lifecycle in marine waters. EFH for federally managed species in the Feather River is limited to those areas downstream of Oroville dam (Pacific Fishery Management Council, 1999; NMFS, 2006). Because the Poe Project has essentially no storage capacity and the effects of Poe Project operations are muted by the downstream Lake Oroville, we conclude that the proposed action will not adversely affect EFH and that consultation under 305(b)(2) of the Act is not necessary.

V. ENVIRONMENTAL ANALYSIS

In this section, we first describe the general environmental setting in the project vicinity and any environmental resources that could be cumulatively affected by relicensing the Poe Project. Then, we address each affected environmental resource. For each resource, we first describe the affected environment—the existing conditions and the baseline against which to measure the effects of the proposed project and any alternative actions—and then the environmental effects of the proposed project, including proposed enhancement measures. Unless otherwise stated, the source of our information is the license application (PG&E, 2003). Our recommendations pertaining to each affected environmental resource may be found in section VII, *Comprehensive Development and Recommended Alternative*.

A. GENERAL DESCRIPTION OF THE NORTH FORK FEATHER RIVER BASIN

The Feather River is a major tributary of the Sacramento River and drains portions of the west slope of the Sierra Mountain range in northern California. The confluence of these two rivers is approximately 20 miles north of Sacramento. Four major tributaries of the Feather River (North Fork, West Branch, South Fork, and Middle Fork) unite as arms of Lake Oroville reservoir (FERC No. 2100), which is 5 miles northeast of the town of Oroville, in the foothills of Butte County (see figure 1).

The headwater portion of the NFFR forms from several small creeks south of Mt. Lassen Peak in northwestern Plumas County. From there, the river flows through the Upper North Fork Feather River and Rock Creek-Cresta projects prior to being utilized by the Poe Project. The confluence with the East Branch of the NFFR is in the Belden bypassed reach of the UNFFR Project (see figure 1). Waters of the Poe Project include Poe reservoir, the 7.6-mile-long Poe bypassed reach, and Big Bend reservoir (Poe afterbay), which is the discharge point for water exiting the Poe powerhouse. The Poe powerhouse and Big Bend reservoir are just upstream of Lake Oroville. Two major tributaries, Mill Creek and Flea Valley Creek, enter the Poe bypassed reach approximately 1 mile downstream of the Poe dam.

The Sierra Nevada crest acts as a barrier to the moisture-laden air that comes from the Pacific Ocean and the cold dry air masses that come from the inter-mountain region in the winter. During the summer, the crest also acts as a barrier to the hot, dry air masses that develop over the inter-mountain region. Portions of the NFFR basin west of the Sierra Nevada crest, near the Poe Project, are within the Mediterranean Climate Zone, which consists of cool, wet winters and mild, dry summers. Precipitation occurs primarily in the winter months, and a substantial snowpack develops during the winter at higher elevations in the NFFR drainage area. The eastern Sierran portion of the NFFR basin is in a rain shadow where little precipitation falls and drier conditions prevail.

The NFFR basin contains extensive forested lands and is relatively sparsely populated.

B. SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR §1508.7), an action may cause cumulative effects on the environment if its effects overlap in space and/or time with the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on information in the license application, agency comments, other filings related to the project, and staff analysis, we identified the following resources that have the potential to be cumulatively affected by the continued operation of the Poe Project in combination with other activities in the upper NFFR Basin: water resources and fisheries resources.

1. Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

For fisheries and water resources, the geographic scope extends from the point upstream where the NFFR enters Lake Almanor, the most upstream reservoir of the Upper NFFR Project, to the point downstream where the NFFR flows into Lake Oroville.

2. Temporal Scope

The temporal scope of our cumulative effects analysis includes past, present, and future actions and their possible cumulative effects on each resource. Based on the license term, the temporal scope looks 30 to 50 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. By necessity, the historical discussion is limited to the amount of available information for each resource.

C. PROPOSED ACTION AND ACTION ALTERNATIVES

1. Water Resources

a. Affected Environment:

Water Quantity and Use

Poe reservoir is located on the NFFR near Pulga, California. It inundates about 1.7 miles of the NFFR, and it has a maximum surface area of 53 acres and maximum storage of about 1,203 acre-feet. Poe reservoir is long and narrow with a maximum width of 400 feet near the dam to a minimum of 150 feet near the upper end of the reservoir. Pool depths in the reservoir not immediately at the dam face range from 10 to 20 feet. PG&E estimates that the average residence time of the reservoir is 7 hours.

The reservoir level fluctuates due to the combined operation of the Cresta and Poe powerhouses in a seasonal pattern, in the summer primarily to meet energy load requirements, and in the winter mostly as the result of storm/snowmelt runoff. About 50 percent of the summer days, the fluctuation is 3 feet; about 35 percent of the time the

fluctuation is between 3 and 6 feet; and about 15 percent of the time, the fluctuation ranges from 6 to 9 feet. Winter fluctuations more than 3 feet primarily result from operation of one or more of the 50-foot-wide radial gates during storm/snowmelt events; frequency of radial gate operation depends on year-to-year variations in high flow events.

The drainage area above Poe reservoir is approximately 1,940 square miles, of which 1,000 square miles is the East Branch NFFR drainage area, a largely unregulated basin except for Antelope Lake, which has 22,500 acre-feet of storage controlling a 71-square-mile drainage area along Indian Creek. Above the confluence with the East Branch, the NFFR is dominated by Lake Almanor, which was constructed in 1913 and is the primary storage reservoir in the basin with a usable capacity of 1,134,000 acre-feet, controlling a drainage area of 491 square miles. Butt Valley reservoir, on Butt Creek, a tributary to the NFFR, has a usable storage volume of approximately 50,000 acre-feet controlling a drainage area of 83.5 square miles. Water supply to Poe reservoir is substantially influenced by regulated flows from upstream hydroelectric projects (Upper NFFR, Bucks Creek, and Rock Creek-Cresta), and from the unregulated portions of the watershed during runoff from winter rain events and spring and early-summer snowmelt.

Several USGS stream gages are present on the NFFR, and table 3 provides a summary of the gages, the verified period of record, and drainage area. The primary sources of inflow to Poe reservoir include outflow from the Cresta powerhouse, bypass flows from the Cresta reach of the NFFR, and direct inflow from minor tributaries. Three perennial tributaries (Camp Creek, Dogwood Creek, and Heinz Creek) enter Poe reservoir. These perennial tributaries and other runoff that reaches the NFFR between the USGS gage above the reservoir (USGS gage no. 11404330) and the USGS gage immediately below the dam (USGS gage no. 11404400) (table 3), have a combined drainage area of approximately 28 square miles. These tributaries represent a small fraction of total flow into the project.

Table 3. USGS stream flow gages in the vicinity of the Poe Project on the NFFR. (Source: USGS, 2007)

USGS Gage No.	Gage Name	Period of Record	Drainage area (square miles)
11404330	NFFR below Grizzly Creek	10-01-1981 to 09-30-2006	1,914
11404360	Cresta powerhouse	10-10-1980 to 09-30-2005	N/A
11404400 ^a	NFFR below Poe dam	10-1-1999 to 09-28-2006 ^b	1,942
11404500 ^c	NFFR near Pulga	04-01-1911 to 09-30-2006	1,953
11404900	Poe powerhouse	10-01-1967 to 09-30-2005	N/A

^a PG&E gage number NF66, a non-recording gage that is read almost daily; flows above 137 cfs are not computed. PG&E proposes to abandon this gage.

^b Records for water years 1976 to 1999 are available on file at USGS.

^c PG&E gage number NF23.

The Poe reach of the NFFR (the bypassed reach), which extends between Poe dam and Poe powerhouse, is 7.6 miles long with a change in elevation of about 500 feet, from about 1,400 to 900 feet in elevation. During periods when flows are less than powerhouse capacity (nominally 3,700 cfs), the primary source of water to the Poe reach is the release from Poe dam. The current license requires a minimum flow of 25 cfs, or greater amount sufficient to maintain 50 cfs as measured at the Pulga USGS gaging station, about 1.6 miles below Poe dam. However, leakage around the radial gate seals at Poe dam during the past 10 years has increased substantially so that at USGS gage no. 11404400, below Poe dam, the flow has averaged about 122 cfs during July, August, and September of 2003, 2004, and 2005. At the Pulga USGS gage, the flow has averaged 128 cfs over the same time period. Both the Mill Creek and Flea Valley Creek tributaries, with a combined drainage area of approximately 9 square miles, enter the Poe reach between Poe dam and the Pulga USGS gaging station.

The combined flows of NFFR below Grizzly Creek (in the Rock Creek-Cresta bypassed reach) and Cresta powerhouse (plus small tributaries) constitute the inflows to Poe reservoir. Outflow from the Poe Project into the lower NFFR is a combination of the NFFR flow near Pulga (bypassed reach) plus Poe powerhouse discharges. Table 4 presents monthly statistics for the Pulga and Poe powerhouse USGS stations; figure 4 shows median monthly flows at the same stations.

In addition to daily and seasonal changes in flow in the Poe reach, there are hourly changes associated with project operation. The Poe dam releases high river flows in excess of powerhouse capacity by opening the large radial gates, with the capacity of each gate at about 40,000 cfs. No operational ramping rates have been established for the bypassed reach and significant hourly changes (over 2,000 cfs) in flow have historically occurred. According to PG&E as stated during the 10(j) meeting held on November 28, 2006, in Sacramento, CA, the majority of the control for ramping at Poe dam occurs upstream at the Rock Creek-Cresta Project, which has larger drum gates and a larger reservoir.

The Poe powerhouse releases water into a confined tailrace that discharges to a wide river channel formed by the upper end of Big Bend reservoir. The two generating units at Poe powerhouse can go from zero to full load (nominally 3,700 cfs) within about 10 minutes. The width of the river channel somewhat mitigates the up to 4-foot increase in tailrace level from zero to full load. In addition, Big Bend dam serves to dampen the rate of water surface fluctuation below the dam by the flow notch cut into the center of the dam for this purpose in 1967. The notch can pass flows up to about 7,000 cfs; at flows greater than 7,000 cfs, water spills over the length of the dam.

Table 4. Monthly discharge statistics for the USGS gaging stations at the NFFR near Pulga (bypassed reach) and the Poe powerhouse. (Source: USGS, 2007)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall
USGS gage no. 11404500 North Fork Feather River at Pulga, CA Water Years 1968 to 2005													
Mean	1,601	1,482	1,838	1,325	1,286	490	87	71	84	111	389	632	780
Maximum	101,000	81,000	53,200	26,100	41,200	7,700	4,120	146	868	2,850	22,600	24,500	101,000
10% Exceedance ^a	3,635	4,002	4,760	4,381	4,572	900	119	117	124	124	506	1,266	1,970
25% Exceedance	230	686	1,888	1,530	1,473	120	92	91	98	103	117	132	138
Median	105	123	175	133	110	63	61	60	61	61	63	71	72
75% Exceedance	60	76	87	72	59	56	55	54	54	55	56	57	57
90% Exceedance	55	59	63	59	54	51	51	48	50	51	50	54	53
Minimum	47	51	53	51	34	34	28	12	5	14	17	25	5
USGS gage no. 11404900 Poe powerhouse below Poe dam near Jarbo Gap, CA Water Years 1968 to 2005													
Mean	2,534	2,802	3,031	2,871	2,610	1,982	1,731	1,783	1,714	1,690	2,009	2,334	2,255
Maximum	4,530	4,670	5,200	4,790	4,700	4,650	3,990	3,470	3,990	3,910	4,590	4,660	5,200
10% Exceedance	4,090	4,190	4,280	4,280	4,250	3,852	2,930	2,770	2,740	2,550	3,290	3,870	3,940
25% Exceedance	3,610	3,830	3,970	3,870	3,820	2,920	2,340	2,380	2,170	2,120	2,540	3,128	3,160
Median	2,675	3,215	3,290	2,990	2,620	1,720	1,665	1,830	1,760	1,770	1,940	2,210	2,090
75% Exceedance	1,483	1,813	2,093	1,840	1,610	981	1,110	1,210	1,280	1,313	1,440	1,590	1,420
90% Exceedance	770	932	1,497	1,390	1,034	593	534	642	584	584	744	968	776
Minimum	0	0	0	0	341	29	31	0	0	0	0	0	0

^a Percent exceedance means that 10, 25, 75, or 90 percent of all daily mean flows for the period of record have been greater than the value shown.

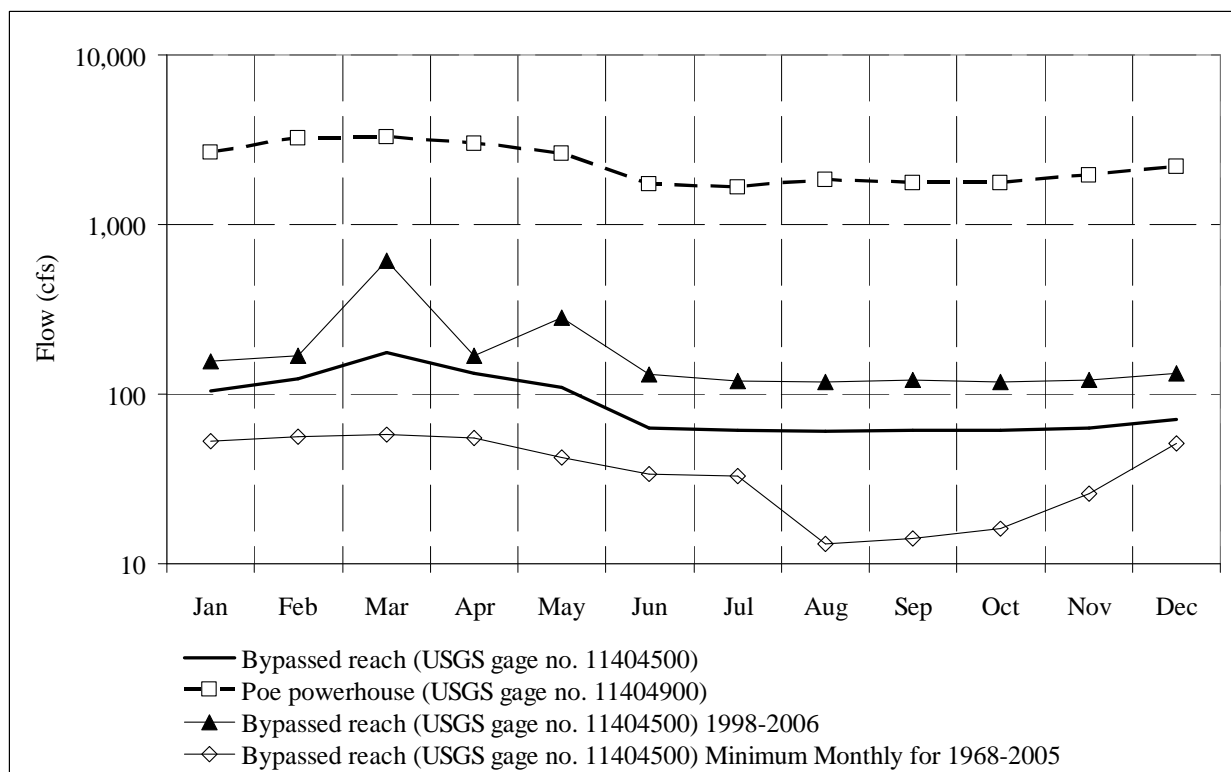


Figure 4. Median monthly flows at USGS gaging stations at the NFFR near Pulga (bypassed reach) and the Poe powerhouse, water years 1968 to 2005. (Source: USGS, 2007)

In addition to power generation, the NFFR is used for municipal and domestic water supply, contact and non-contact recreation, cold freshwater habitat, and wildlife habitat (CVRWQCB, 1998a). There are minor consumptive uses of waters of the NFFR upstream. Although water is stored in Lake Almanor for later consumptive use, the majority of consumptive and other water uses occur downstream of the Poe Project. There are no consumptive uses identified in the Poe reach.

PG&E holds five water rights that allow diversion of water for operations of the Poe Project. Lake Almanor and Butt Valley reservoir are operated under claim of pre-1914 water rights as specified in the Water Board's Statement of Water Diversion and Use Nos. 922 and 923. PG&E also has riparian water rights for the direct diversion of water from the NFFR for use at the Poe Project. Finally, PG&E has obtained permitted rights from the Water Board Division of Water Rights for full project operation (license no. 9871 and permit no. 20864).

Water Quality

The NFFR basin is part of the Sacramento River basin, and the Fourth Edition of the Central Valley Regional Water Quality Control Board (CVRWQCB) Basin Plan

(Basin Plan) for the Sacramento and San Joaquin River basins (CVRWQCB, 1998a) applies to waters in the project area. The Basin Plan designates existing beneficial uses for water bodies in the basin. Existing beneficial uses designated for the NFFR are hydropower generation, municipal and domestic supply, water contact recreation, non-water contact recreation, cold freshwater habitat, cold spawning habitat, and wildlife habitat.

Water quality standards applicable to surface waters in the project area are defined in three primary documents: the Basin Plan (CVRWQCB, 1998a); the California Toxics Rule (40 CFR Part 131); and drinking water standards set in California Code of Regulations Title 22 (CDHS, 2002), which are applicable to surface waters of the NFFR designated for municipal water supply.

Table 5 summarizes selected applicable criteria for the NFFR. Because the NFFR is not used for water supply in the project area, and there are no issues related to water supply, only the criteria included in the Basin Plan and related to toxics are shown in table 5.

The water quality in the NFFR has historically been generally suitable for all beneficial uses as identified in the CVRWQCB Water Quality Control Plan Report (CVRWQCB, 1998b). Bacterial levels are below all standards for contact recreation; the water is suitable for domestic and municipal use but is not satisfactory for untreated consumption. Currently there are no fish consumption advisories issued by the California Office of Environmental Health Hazard Assessment Office in the project area.

The Water Board recently (October 2006) included the NFFR downstream of Lake Almanor to Lake Oroville, a length of 49 miles, on its Clean Water Act section 303(d) list of water-quality-limited water bodies as being impaired for temperature (potential sources hydromodification, flow regulation/modification) and mercury (potential source unknown). The U.S. EPA approved this listing in November 2006. The Water Board has proposed to complete its Total Maximum Daily Load (TMDL) process to address this impairment by 2019. The Feather River, from Oroville Dam, downstream to its confluence with the Sacramento River is listed as impaired for pesticides (chlorpyrifos and Group A pesticides), mercury, and unknown toxicity.

Table 5. Water quality criteria for the NFFR in the Poe Project area. (Source: CVRWQCB, 1998a; 40 CFR Part 131)

Constituent	Objectives of Basin Plan for the Sacramento and San Joaquin River Basins	California Toxics Rule
Temperature	Natural water temperatures shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration does not adversely affect beneficial uses. At no time or place shall the temperature be increased more than 5°F above the natural receiving water.	--
Dissolved oxygen (DO)	Monthly median of mean daily DO concentration shall not fall below 85% of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75% of saturation. DO concentrations shall not be reduced below 7.0 milligrams per liter (mg/l).	--
pH	The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 units.	--
Specific conductance	Shall not exceed 150 μ mhos/cm (90 percentile) in well-mixed waters.	--
Fecal coliform	Based on a minimum of not less than five samples for any 30-day period, shall not exceed a geometric mean of 200/100 milliliters (ml), nor shall more than 10% of the total number of samples taken during any 30-day period exceed 400/100 ml.	--
Oil and grease	Waters shall not contain oils, greases, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.	--

Constituent	Objectives of Basin Plan for the Sacramento and San Joaquin River Basins	California Toxics Rule		
Turbidity	Shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed increases of 1 nephelometric turbidity unit (NTU) where natural turbidity is 0 to 5 NTU, increases of 20% where natural turbidity is 5 to 50 NTU, increases of 10 NTU where natural turbidity is 50 to 100 NTU, and increases of 10% where natural turbidity is >100 NTU.	--		
Tastes and Odors	Shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affects beneficial uses.	--		
Methyl- <i>tert</i> -butyl ether (MTBE)	--	--		
		Dissolved Concentrations (mg/l)		
Trace Metals		4-day Avg.	1-hr Avg.	Ins. Max.
Aluminum	--	0.087	0.750	--
Arsenic	--	0.15	0.34	--
Barium	--	--	--	--
Cadmium ^a	--	0.0013	0.0020	--
Chromium (total)	--	--	--	--
Copper ^a	--	0.0050	0.0070	--
Iron	--	--	--	1.0
Lead ^a	≤0.015 in waters designated as domestic or municipal supply	0.0012	0.030	--

Constituent	Objectives of Basin Plan for the Sacramento and San Joaquin River Basins		California Toxics Rule		
Manganese	--		--	--	--
Mercury (inorganic)	--		0.00077	0.0014	--
Nickel ^a	--		0.026	0.23	--
Selenium	--		0.005	0.02	--
Silver ^a	--		--	--	0.00105
Zinc ^a	--		0.066	0.065	--

^a Hardness-dependent criteria. The listed criteria are for a hardness of 50 mg/l.

Various agencies and other entities, including PG&E (licensee for Project Nos. 1962 and 2105), have conducted long-term monitoring programs for water quality in the NFFR. Water quality data from the USGS station on the NFFR near Pulga provides the most comprehensive historical water quality data in the area. Table 6 summarizes historical water quality data as measured at the USGS Pulga station.

Table 6. Historical water quality data at the USGS station on the NFFR near Pulga (July 1963 to September 1977). (Source: USGS, 2005b)

Parameter	Minimum Measurement	Maximum Measurement	Average
Temperature (°C)	6.0	23.5	--
Dissolved Oxygen (mg/l)	8.2	12.0	10.0
Conductivity (µmhos/cm)	74	147	103
pH (units)	7.7	8.3	8.0
Nitrate (mg/l)	0.01	0.70	0.26
Alkalinity (mg/l)	36	74	53
Calcium (mg/l)	6.8	15.0	10.5
Magnesium (mg/l)	2.3	7.1	4.8
Turbidity (NTU)	1	8	2
Sodium (mg/l)	2.1	5.6	4.3
Potassium (mg/l)	0.5	1.7	1.2
Bicarbonate (mg/l)	39	90	60
Sulfate (mg/l)	0	4.0	2.3
Chloride (mg/l)	0.4	3.0	1.1
Silica (mg/l)	0.3	19.0	12.0
Total Dissolved Solids (mg/l)	51	82	64

As part of the applicant's relicensing efforts, two water quality monitoring programs were conducted, one in March 1999 through September 2000, and the second from March 2003 through November 2003. The applicant established thirteen water quality monitoring stations: upstream of the project (1B, 1C), at the entrance to Poe reservoir (1A), Poe reservoir at the dam (4A), the bypassed reach (2A, 2B, 3, 5, 6), Poe powerhouse tailrace (4B), upstream of Big Bend dam (7), and in the two largest tributaries, Mill Creek and Flea Valley Creek. Table 7 shows the stations, the month of

sampling, and the parameter where applicable water quality standards were exceeded during these monitoring programs.

Table 7. Constituents that exceeded applicable water quality standards during PG&E's water quality studies. (Source: PG&E, 2003; Appendix E2-4)

Sampling Site	Parameter	Date	Standard	Measured Concentration
Poe-1A	Turbidity (NTU)	Mar 99	5	7.0
	Iron (mg/l)	Mar 99	300	340
	Turbidity (NTU)	Sep 99	5	5.6
	Iron (mg/l)	Mar 99	300	340
	Turbidity (NTU)	Mar 00	5	7.2
	Aluminum (ug/l)	May 03	87	188
Poe-2A	Turbidity (NTU)	Mar 99	5	6.0
	Aluminum (ug/l)	May 03	87	111
Poe 3	Turbidity (NTU)	Mar 99	5	6.7
	Iron (mg/l)	Sep 99	300	310
	Aluminum (ug/l)	May 03	87	116
Poe 5	Aluminum (ug/l)	Mar 03	87	101
	Aluminum (ug/l)	May 03	87	108
Poe 7	Aluminum (ug/l)	Mar 03	87/200 ^a	320
	Aluminum (ug/l)	May 03	87	143
Flea Valley Creek	Aluminum (ug/l)	May 03	87	129
	Aluminum (ug/l)	Aug 03	87	121
	Specific conductance (µmhos/cm)	Oct 03	150	156
Mill Creek	Aluminum (ug/l)	May 03	87/200 ^a	240

^a Aluminum has two standards, 87 ug/l (EPA) and 200 ug/l (CA Dept. of Health Services). These samples exceeded both standards.

Given that sampling occurred over three seasons and at 13 stations for standard in situ parameters, and for total and dissolved metals and nutrients, relatively few (19) exceedances were observed within the project area. Turbidity, iron, aluminum, and

specific conductance, all subject to periodic increases associated with high precipitation and runoff, were the only constituents with measured concentrations above the applicable standard. More than half (10) of these exceedances occurred in waters entering the project reach: either at the entrance to Poe reservoir (1A) or in the tributaries (Mill and Flea Valley creeks).

The maximum concentration of total mercury measured during 1999, 2000, and 2003 sampling by PG&E was 0.00000283 mg/l at Poe-1A (upstream of Poe reservoir) on March 27, 2003, which was below any applicable regulatory criteria. PG&E did not detect the presence of PCBs in the bypassed reach upstream of the Poe powerhouse during its monitoring in 1999, 2000, and 2003. Silver concentrations measured during the same sampling periods were also generally less than test reporting limits, except for two samples, in June and September 1999. Concentrations of silver (in total unfiltered samples) during these two events were also below applicable regulatory criteria.

Trace metal sampling was conducted on runoff from two spoil piles associated with Poe powerhouse diversion tunnel construction: near Bardee's Bar (adit no. 1) and 1 mile upstream of Poe powerhouse adjacent to the railroad grade (adit no. 2). A drainage bypass culvert from the diversion tunnel passes under the spoil pile at adit no. 2 and discharges into the NFFR. The drainage culvert and stations downstream were sampled during precipitation events in 2000 and 2001, with additional testing in 2002 to determine the potential toxicity of runoff from the spoil areas. The highest concentrations of iron, manganese, and nickel were measured at the bypass culvert at adit no. 2. Water quality standards for iron, copper, cadmium, and manganese (see table 5) were exceeded in the spoil pile runoff, but not in the NFFR during the same sampling period.

The observed dissolved oxygen (DO) concentrations in the Poe reach of the NFFR were generally near or above saturation. Because of the stable temperature regime, high aeration potential for the NFFR (high-gradient stream with riffles and rapids), and low density of aquatic plants, DO levels are maintained at or near saturation level throughout the project area. The observed diel fluctuation was relatively small at about 1.0 mg/L, indicating low levels of aquatic plant activity (photosynthesis/respiration).

The applicant conducted total and fecal coliform bacteria testing at four stations on the NFFR and at Flea Valley Creek and Mill Creek. Total and fecal coliforms were present at relatively low concentrations, and all detected total and fecal coliform concentrations were lower than the criteria for contact recreation.

Water temperature in the NFFR was monitored at a number of locations. From June to September 1999, 11 stations were continuously monitored for water temperature at 5-minute intervals; data were reported as hourly averages. In 2000, Poe-5, Poe-2A, and Poe-3 were sampled from May to September, and the remaining 8 stations were monitored from June to September. In 2003, the original 11 stations with the addition of Poe 7 at Big Bend dam were monitored for water temperature at 15-minute intervals,

averaged to hourly, from June through September. Figure 5 shows the results of the water temperature monitoring in 1999, 2000, and 2003.

The typical pattern for summer water temperatures in the Poe bypassed reach, although somewhat variable from year to year, shows warming from temperatures in the range of 17 to about 20°C in June to peaks of 19 to 22°C in July and August, and then cooling to a range of 17 to about 19°C in September. Within the reach there is a general warming trend from the upstream end to the downstream end of the reach, with the highest temperatures and the greatest increase in temperature reported at the station just upstream of the Poe powerhouse. This may be indicative of the wider, flatter nature of the bypassed reach in its lower end, and reduced shading, allowing temperatures to warm more rapidly than in the upper more narrow, steeper-gradient part of the reach. During the month of June, a decrease in temperature was observed from the upstream end of Poe reservoir to below Poe dam, which may be the result of cooler air temperatures, particularly at night, while a temperature decrease was observed in all months from above the Poe powerhouse to the Poe powerhouse tailrace. The lower temperatures in the tailrace likely reflect the temperature of Poe reservoir, which is minimally affected by passage through the tunnel and penstocks, compared to water released from the dam, which is subjected to natural warming as it passes down the approximately 8-mile-long bypassed reach. By September both the sun angle and air temperatures decrease, and the temperature differences within the reach are reduced, and the plots of water temperature appear to be “flatter” (see figure 5).

The Water Board and the other parties to the Rock Creek-Cresta relicensing settlement agreement (SA) have established a 20°C maximum target temperature in the NFFR, for the protection of coldwater habitat for trout. The summer water temperature data collected by PG&E indicate that the Poe reach often exceeds the 20°C maximum target, although as described above, warmer temperatures are more common in the lower end of the reach. Table 8 shows that, of the total days sampled by station, only 20 percent of the summer days sampled exceeded 20°C immediately below Poe dam, compared to 39 percent at Bardee’s Bar about midway through the reach, and 68 percent just above the Poe powerhouse at the lower end of the reach. The powerhouse tailrace station again reflects the cooler inflow from Poe reservoir, with only 23 percent of the days exceeding 20°C.

The temperatures recorded at stations Poe-1A and Poe-1C are representative of the inflow temperatures into the Poe Project, and show that the 20°C target maximum was exceeded about 30 percent of the time for inflow from the Cresta bypassed reach, and about 17 percent of the time from the Cresta powerhouse. This indicates that NFFR water temperatures have already warmed substantially before reaching the Poe Project reach. Additional information on upstream water temperatures in the NFFR is contained in Commission staff’s final EIS for the relicensing of the Upper North Fork Feather River Project (FERC, 2005).

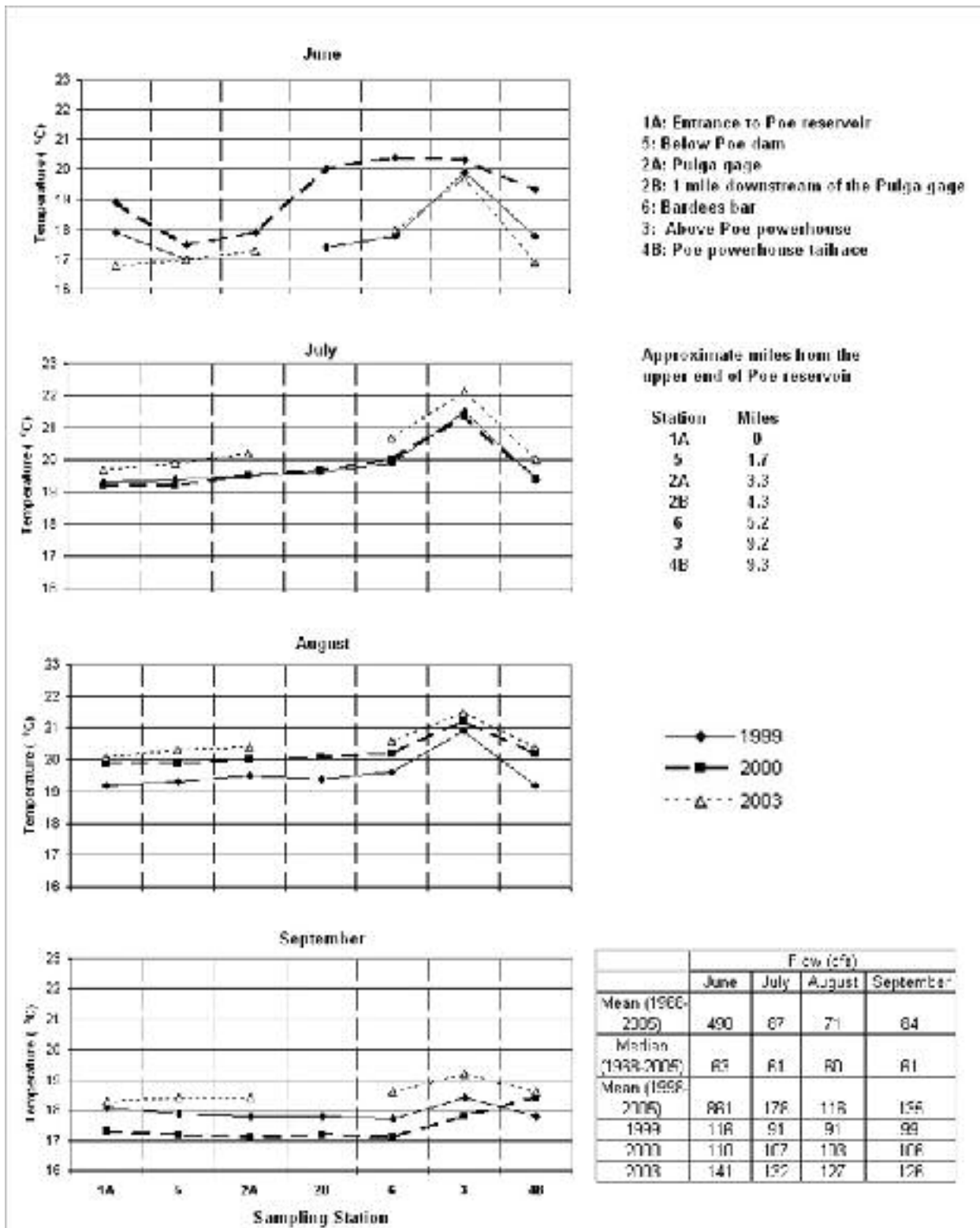


Figure 5. Mean monthly water temperatures by sampling station in the Poe bypassed reach, NFFR, June through September, 1999, 2000, and 2003. (Source: PG&E, 2003; USGS, 2007)

Table 8. Number of days that daily mean water temperature exceeded 20°C during June through September (1999, 2000, 2003) in Poe Project and nearby waters, North Fork Feather River, CA. (Source: PG&E, 2003, as modified by staff)

Station	Total Days Sampled	# of Days > 20°C	Percent of Days > 20°C
Above Cresta powerhouse (Poe-1C)	306	93	30.4
Below Cresta powerhouse (Poe-1A)	287	48	16.7
Below Poe dam (Poe-5)	324	65	20.0
At Pulga bridge (Poe-2A)	287	81	28.2
Below Pulga bridge (Poe-2B)	189	46	24.3
Bardee's Bar (Poe-6)	308	121	39.3
Above Poe powerhouse (Poe-3)	316	215	68.0
Powerhouse tailrace (Poe-4B)	322	74	23.0

b. Environmental Effects:

Effects of Project Minimum Flows on Water Temperature

The operation of the Poe Project modifies the typical hydrograph of the NFFR by impounding water above, and decreasing the volume of water in the river below the dam (i.e., in the bypassed reach). This results in increased water temperature in the bypassed reach in the summer months because of lower water volume, decreased depth and velocity, and a resulting increase in radiational heating. Both the inflows to the project and Poe bypassed reach water temperatures have historically exceeded the 20°C maximum target (see table 8). To address this, PG&E proposes to increase current year-round 50-cfs minimum instream flows as measured at the Pulga USGS gage to 150 cfs.

In response to the REA notice, the Forest Service specified and FWS, Cal. Fish and Game, Butte County, and American Whitewater recommended a minimum flow regime that would vary by season (month) and water year type (wet, normal, dry, critically dry), and generally would be several times higher than PG&E's proposed flows (table 9). Our analysis of the PG&E and agency flow regimes is included in section V.C.2, *Aquatic Resources*, because the rationale for those regimes was primarily for the enhancement of fisheries habitat. The analysis in this section also includes a staff-identified minimum flow regime (table 9).

Following the issuance of the draft EA, Cal Fish and Game, Interior, Butte County, the Water Board, National Park Service (NPS), and Plumas County provided a revised minimum flow recommendation to reduce water temperatures in the bypassed reach, as well as to provide habitat benefits, and this revised recommendation is also

shown in table 9. The agencies stated that, if the Commission accepts this revised flow recommendation, they would no longer recommend the water temperature moderation (WTM) flows (discussed below) that were part of their initial flow recommendation. The initial agency flow recommendation also was specified by the Forest Service in its preliminary section 4(e) conditions. The Forest Service, however, has not modified that condition, so the initial flow recommendation remains as a section 4(e) condition.

Table 9. Summary of minimum instream flow alternatives (in cfs) for the Poe Project bypassed reach. (Source: PG&E, 2003; agency responses to REA notice; Cal Fish and Game, 2006; and staff)

Water Year Type	Proposed, Specified, Recommended, or Identified by	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet	PG&E	150	150	150	150	150	150	150	150	150	150	150	150
	FS section 4(e) condition ¹	325	350	350	400	425	350	300	300	300	250	275	300
	Revised Agency Recommendation	325	350	350	400	500	500	425	350	300	250	275	300
	Staff	250	250	250	275	300	250	225	225	225	200	215	225
Normal	PG&E	150	150	150	150	150	150	150	150	150	150	150	150
	FS section 4(e) condition	300	325	350	375	325	300	275	250	250	250	275	300
	Revised Agency Recommendation	300	325	350	400	400	400	400	350	300	250	275	300
	Staff	225	225	225	250	275	225	200	200	200	200	200	225
Dry	PG&E	150	150	150	150	150	150	150	150	150	150	150	150
	FS section 4(e) condition	180	225	280	280	250	220	200	200	180	150	150	180
	Revised Agency Recommendation	180	225	300	325	350	350	350	260	180	180	180	180
	Staff	165	190	215	215	200	180	180	180	165	150	150	165
Critically Dry	PG&E	150	150	150	150	150	150	150	150	150	150	150	150
	FS section 4(e) condition	150	225	270	270	250	220	180	180	180	150	150	150
	Revised Agency Recommendation	180	225	300	300	300	300	300	260	180	180	180	180
	Staff	150	190	210	210	200	180	165	165	165	150	150	150

¹ The FS section 4(e) regime was also the initial joint resource agency minimum flow regime

Our Analysis

The temperature regime of the Poe reach of the NFFR is primarily determined by the temperature of water entering from upstream, and secondarily by project operations and meteorological conditions. To evaluate the temperature regime in the project area, two stream network water temperature (SNTEMP) models were used by PG&E to model

average daily water temperature in the Poe reach. One of these models used average monthly meteorological data and the other used site specific daily meteorological data gathered from a location near the Poe powerhouse. This modeling, which represented flows during 1999, 2000, and 2003, all of which were normal water years, was included in the license application. The SNTTEMP model predicts water temperature over a time step that is equal to or greater than the travel time through the study reach. At the existing minimum bypass flow of 50 cfs, the travel time for the Poe bypassed reach is approximately 2 days, so a time step (averaging period) of 2 days was used in the model. The SNTTEMP model was used to predict water temperatures under various bypass flow releases. The modeled flows ranged from the current license requirement of 50 cfs up to 1,250 cfs. Eight release scenarios were modeled that included 50, 100, 150, 200, 300, 500, 850, and 1,250 cfs. In addition to the range of flows, two environmental conditions, normal and extreme, were included in the temperature simulation matrix.

Table 10 provides a summary of the SNTTEMP model results for station Poe-3 (immediately upstream of the Poe powerhouse), for the simulation matrix described above. This station, at the lower end of the bypassed reach, showed the highest water temperatures during the monitoring studies, so simulations at this location would represent a “worst-case” scenario for water temperatures in the reach. The 50-cfs release presented in table 10 is representative of the existing licensed conditions in the Poe bypassed reach; 110 cfs is the approximate flow in the bypassed reach during the summer and early fall for the past 10 years (including leakage), while 150 cfs is PG&E’s proposed minimum flow.

The model indicates that PG&E’s proposed minimum flow release would decrease water temperatures during the summer months of normal years by 0.5 to 1.3 degrees, compared to a 50-cfs release, and by 0.1 to 0.3 degrees compared to 110 cfs (table 10). During extreme conditions, PG&E’s proposed flows would reduce summer water temperatures by 0.5 to 1.4 degrees, compared to a 50-cfs release, and by 0.2 to 0.4 cfs compared to 110 cfs. The Forest Service 4(e) flow regime (table 9) would reduce water temperatures from 0.6 to 1.9 degrees in normal years, and from 0.6 to 1.7 degrees in extreme conditions, compared to a 50-cfs release (table 10). Compared to 110 cfs, the Forest Service 4(e) flow regime would reduce water temperatures from 0.2 to 0.8 degrees in normal years, and from 0.3 to 0.6 degrees in extreme conditions. The revised agency flow regime would reduce water temperatures from 0.7 to 2.0 degrees in normal years, and from 0.6 to 2.1 degrees in extreme conditions, compared to a 50-cfs release (table 10). Compared to 110 cfs, the revised agency flow regime would reduce water temperatures from 0.3 to 1.0 degrees in normal years, and from 0.3 to 1.1 degrees in extreme conditions. Also included in table 10 is the staff identified minimum flow regime, which is discussed in detail in section V.C.2, *Aquatic Resources*. The modeling indicates that this flow regime would reduce water temperatures from 0.6 to 1.6 degrees in normal years and from 0.5 to 1.4 degrees in extreme conditions, compared to a 50-cfs

Table 10. Results of SNTEMP modeling for station Poe-3 in the NFFR Poe bypassed reach, showing predicted water temperatures under a range of flow releases (Source: Woodward-Clyde, 1986; PG&E, 2003)

Flow Release (cfs)	Normal Conditions				Extreme Conditions			
	June	July	August	September	June	July	August	September
50	19.8	22.2	21.7	18.5	21.4	23.1	22.3	19.5
100	19.1	21.3	21.0	18.1	20.8	22.2	21.8	19.2
150	18.8	20.9	20.6	18.0	20.6	21.7	21.6	19.0
200	18.6	20.6	20.4	17.9	20.4	21.4	21.4	18.9
300	18.3	20.3	20.2	17.8	20.2	21.0	21.3	18.8
500	18.1	20.0	20.0	17.7	20.0	20.7	21.1	18.7
850	17.9	19.8	19.8	17.7	19.8	20.5	21.0	18.6
1,250	17.9	19.7	19.7	17.6	19.8	20.4	20.9	18.6
Temperature reduction from 50 to 150 cfs (°C)	1.0	1.3	1.1	0.5	0.8	1.4	0.7	0.5
Temperature reduction from 110 to 150 cfs (°C)	0.2	0.3	0.3	0.1	0.2	0.4	0.2	0.2
Temperature reduction from 50 cfs to staff-identified flow (°C) ^a	(225) 1.2	(200) 1.6	(200) 1.3	(200) 0.6	(180) 1.0	(165) 1.4	(165) 0.7	(165) 0.5
Temperature reduction from 110 cfs to staff-identified flow (°C) ^a	0.4	0.6	0.5	0.2	0.3	0.5	0.2	0.2
Temperature reduction from 50 cfs to FS 4(e) flow (°C) ^a	(300) 1.5	(275) 1.9	(250) 1.4	(250) 0.6	(220) 1.0	(180) 1.7	(180) 0.9	(180) 0.6
Temperature reduction from 110 cfs to FS 4(e) flow (°C) ^a	0.7	0.8	0.6	0.2	0.4	0.6	0.3	0.3
Temperature reduction from 50 cfs to revised agency flow (°C) ^a	(400) 1.6	(400) 2.0	(350) 1.5	(300) 0.7	(300) 1.2	(300) 2.1	(260) 1.0	(180) 0.6
Temperature reduction from 110 cfs to revised agency flow (°C) ^a	0.8	1.0	0.7	0.3	0.6	1.1	0.5	0.3

- ^a Where the agency or staff-identified flow (cfs; in parentheses) does not match the modeled flow, we use the temperature for the modeled flow that is closest to the recommended flow, or interpolated between two modeled flows.

release. Compared to 110 cfs, the staff identified minimum flow regime would reduce water temperatures from 0.2 to 0.6 degrees in normal years, and from 0.2 to 0.5 degrees in extreme conditions. None of the flow regimes would result in water temperatures below the 20°C maximum target for coldwater species in all months, although all the regimes would nearly reach the maximum target in normal years, with the revised agency flow regime coming the closest to meeting the target temperature. The staff flow regime, however, would result in water temperatures very close to the Forest Service and revised agency flow regimes.

Table 10 also includes simulation results for flows higher than are being recommended by any entity as a minimum flow, but that are included to illustrate that the Poe reach is relatively warm, and that even the highest flow modeled (1,250 cfs) would not be entirely successful in reducing water temperatures to below the 20°C maximum target under all conditions. As discussed above (table 8; figure 5), the Poe reach of the NFFR exceeds the 20°C maximum target temperature during the summer months, and SNTTEMP modeling shows that during July and August (the critical months) under both normal and extreme conditions, the target maximum temperature would be exceeded under virtually all flow releases modeled. Temperatures could be maintained at or below 20°C at flow releases of 500 to 1,250 cfs during normal years only. This indicates that instream flow releases would have a limited capability to mitigate warmer water temperatures in the bypassed reach. This does not mean, however, that the entire reach would exceed the 20°C maximum target. As described above, there is a temperature gradient within the reach, so although the lower end of the reach may exceed 20°C, upstream parts of the reach may remain below 20°C (figure 5).

As described above, Cal Fish and Game and other agencies provided a revised recommended minimum flow schedule. Cal Fish and Game stated this revised agency flow schedule is based on the results of their modeling of the Poe bypassed reach with the stream segment temperature (SSTEMP) model. The SSTEMP model is very similar to SNTTEMP, and the calibration process produced results comparable to observed conditions and similar to the earlier SNTTEMP modeling. This SSTEMP model for the Poe Reach is estimated to have an accuracy range of 0.4 to 0.5°C according to Cal Fish and Game, PG&E, and other resource agencies. Table 11 provides a summary of the results of the SSTEMP modeling by Cal Fish and Game.

Table 11. Results of SSTEMP modeling providing predicted percent of time the temperature target of 20°C would be exceeded in June, July, and August of 1999, 2000, and 2003 for the Poe bypassed reach. (Source: Cal Fish and Game, 2006)

Discharge (cfs)	% of Month 20°C Temperature Exceeded		
	June	July	August
110	50.8	88.2	39.8
150	42.6	76.3	22.6
180	37.7	69.9	17.2
200	31.1	61.3	17.2
250	26.2	47.3	9.7
260	24.6	41.9	6.5
300	23.0	23.7	3.2
350	23.0	15.1	2.2
400	18.0	8.6	2.2
425	16.4	8.6	1.1
500	9.8	5.4	0.0
550	6.6	4.3	0.0
600	3.3	2.2	0.0
700	0.0	0.0	0.0
800	0.0	0.0	0.0

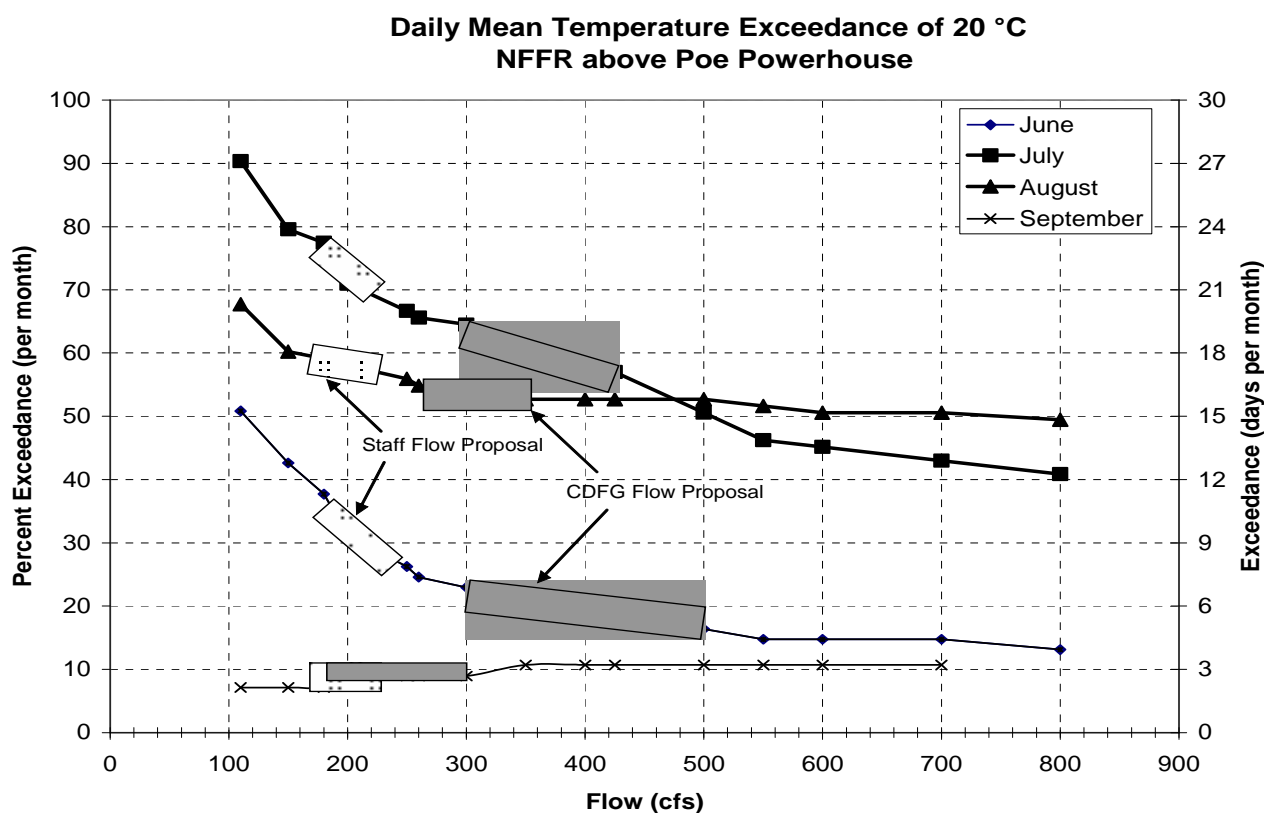
Note: The temperature target as defined by Cal Fish and Game is when the water temperature at the downstream end of the Poe bypassed reach exceeded 20°C and the temperature increase over the reach was greater than 1°C on each day.

Table 11 shows that, based on SSTEMP modeling, similar to the SNTMP modeling, some improvement in water temperature in the Poe bypassed reach could be achieved with higher flows. However, due to inflow temperatures, no amount of flow would always be successful in reducing water temperatures to below the 20°C target under all conditions. Table 12 illustrates that the inflow temperature is often above 20°C during July and August.

Table 12. Percent of time that the water inflow to Poe reservoir exceeds 19, 20, 21, and 22°C. (Source: Cal Fish and Game, 2006)

Month	% of days where inflow temperatures exceeded the listed values			
	19°C	20°C	21°C	22°C
June	16.4	4.9	0.0	0.0
July	74.2	22.6	4.3	0.0
August	89.2	38.7	6.5	3.2

Figure 6 provides a graphical representation of the temperature benefit of the revised agency and staff minimum flow recommendations over the range of flows proposed for the varying water year types. This figure shows that, during June and July, the revised agency flow regime would provide approximately four additional days with flows below 20°C, two days during August, and no substantial change in temperature during September.



Note: Boxes represent the range of flow for the staff and revised agency (labeled CDFG Flow Proposal) flow recommendations.

Figure 6. Trend in incremental temperature benefit for revised agency and staff-recommended flow regimes, based on SSTEMP modeling. (Source: PG&E, 2006, as modified by staff)

Effects of Water Temperature Moderation Flows

The initial joint agency minimum flow regime includes a real-time WTM operation policy for the warm months of June, July, August, and September. The Forest Service also included WTM operations as a section 10(a) recommendation (no. 24[3]), but not as a section 4(e) condition. Under the WTM flows, a minimum instream flow of up to 500 cfs would be released in wet and normal water years, 450 cfs in dry water

years, and 420 cfs in critically dry water years, when real-time temperature monitoring at the upstream (Poe dam) and downstream end of the Poe reach (immediately above Poe powerhouse) indicates the downstream station water temperature is greater than 20°C and the difference between the upstream and downstream stations is greater than or equal to 1°C. The agencies' initial flow regime would also include, in association with this WTM operation, a Water Temperature Maintenance, Moderation, and Monitoring Plan, which would specify the monitoring program in the reach, and the procedures for implementing WTM operations. The revised agency minimum flow recommendation would not include a WTM provision, if the Commission were to adopt the new flow regime.

PG&E, in its comments on the Forest Service 10(a) recommendation no. 24(3), objects to the WTM flows. PG&E states that the flow increases for temperature moderation would be significant, ranging from 43 to 150 percent, but would only reduce temperatures from 0.2 to 0.5°C. It further states that the WTM flows would produce a reversed annual hydrograph, with higher flows in the summer. As discussed in *Aquatic Resources*, PG&E states that the temperature moderation flows would also adversely affect sensitive fish and amphibian species. In its December 19, 2005, filing of alternative section 4(e) conditions, PG&E addresses Forest Service 4(e) condition no. 24(1) and 10(a) recommendation no. 24(3) together. PG&E's alternative condition would be to delete the reference to WTM flows in condition no. 24[1], table 9, and to eliminate the WTM flow measure (10[a] recommendation no. 24[3]).

Our Analysis

The results of the SNTEMP modeling can also be used to examine the potential effects of the agency-recommended WTM flows on water temperatures in the Poe reach. Table 13 summarizes the July and August water temperatures predicted by the modeling under the various minimum flow scenarios, and the agencies' recommended WTM flows. We, however, only provide results for WTM flows under "normal" and "critically dry" years, because the modeling only provided results for "normal" and "extreme" conditions (even though the WTM flows have a third, middle category, "dry"). Using "normal" and "critically dry" conditions, however, still allows assessment of the full range of WTM flows. These data indicate that each increment of higher flow would result in some reduction in water temperature, although the only flow that would meet the 20°C maximum target is the WTM flow in normal water years. WTM flows would lower the predicted water temperature by 0.3°C in July and 0.2°C in August in normal water years, compared to the initial agency minimum flow regime, and by 0.6°C in July and 0.4°C in August, compared to the staff-identified flows. During critically dry years, the 20°C target would not be met under any minimum flow scenario or WTM flows, although it is predicted that the WTM flows would decrease water temperatures by 0.6°C in July and 0.2°C in August, compared to the initial agency minimum flow regime, and by 0.9°C in July and 0.4°C in August, compared to the staff-identified flows. Based on this analysis,

Table 13. Current minimum flows, PG&E-proposed minimum flows, initial agency minimum and WTM flows, staff-identified minimum flows, and predicted water temperatures (based on SNTEMP modeling) for the Poe bypassed reach. (Source: Staff, based on Woodward-Clyde, 1986; PG&E, 2003)

Month	Normal Year		Critically Dry Year	
	Flow (cfs)	Predicted Temp (°C) ^a	Flow (cfs)	Predicted Temp (°C)
July (existing)	50	22.2	50	23.1
August (existing)	50	21.7	50	22.3
July (PG&E proposed)	150	20.9	150	21.7
August (PG&E proposed)	150	20.6	150	21.6
July (staff flows)	200	20.6	165	21.7
August (staff flows)	200	20.4	165	21.6
July (initial agency flows)	275	20.3	180	21.4
August (initial agency flows)	250	20.2	180	21.4
July (WTM flows)	500	20.0	420	20.8
August (WTM flows)	500	20.0	420	21.2

^a If minimum flow was not identical to modeled flow, we use the temperature for the modeled flow closest to the recommended flow, or interpolate between two modeled flows.

there appears to be a limited basis for implementing WTM flows in addition to the initial agency or staff minimum flow regimes, because WTM flows would be double (or greater) than the agency or staff flows, and would result in minimal improvement (reduction) in water temperature.

There also appears to be little basis for implementing WTM flows in combination with either the existing (50 cfs) or the PG&E proposed (150 cfs) minimum flow. SNTEMP modeling indicates that there would be a reduction in water temperatures of from 1.7 to 2.2°C from 50 cfs to WTM flows in normal water years, and a reduction of from 1.1 to 2.3°C in critically dry water years, but the 20°C target would only be met in normal years. WTM flows, however, would be from 8 to 10 times greater than the current minimum flow, which would result in widely fluctuating flows in the bypassed reach (if operations resulted in periods at the minimum flow and at the WTM flows). Such operations could have negative effects on aquatic and terrestrial biota due to widely fluctuating habitat availability and suitability, flushing, and stranding. For PG&E's proposed 150 cfs, modeling predicts that WTM flows could decrease water temperatures by 0.6 to 0.9°C in normal years and by 0.4 to 0.9°C in critically dry years, with the 20°C target again only met in normal years. This would require flow releases about three times higher than PG&E's proposed flow and would result in similar effects as WTM flows

paired with existing minimum flow, although flow fluctuations between the PG&E flow and the WTM flow would be less, likely resulting in fewer adverse effects on other resources.

As discussed in section V.C.1.c, *Cumulative Effects*, there are ongoing efforts to reduce water temperatures at the upstream Rock Creek-Cresta and Upper North Fork Feather River projects. We discuss the effects of potential changes in upstream water temperatures on water temperatures in the Poe bypassed reach in that section.

Temperature modeling, although an excellent tool for assessing potential future conditions under a variety of operating conditions, cannot predict with absolute certainty the water temperatures that may occur with implementation of higher minimum flows in the Poe bypassed reach, or that may result from upstream measures to reduce water temperatures, which may or may not occur. The natural variability of weather events often cannot be fully captured by modeling. Monitoring water temperatures within the bypassed reach, including inflow water temperature, on a long-term basis would determine the actual effects of higher minimum flows and also any changes in the inflow temperature that may occur in the future. Depending on the monitoring results, project operations at Poe may be modified (e.g., by varying the minimum flow releases under certain conditions) to meet the maximum temperature target of 20°C.

Ramping Rates

Ramping rates are the rate at which flow is changed when moving from one release level to another. Increasing flows (up-ramping) may have effects on both aquatic and terrestrial resources and recreational uses, if the rate of increase is high. Likewise, decreasing flows (down-ramping) may affect aquatic resources, if the rate of decrease is fast enough to cause stranding of aquatic biota or desiccation of habitat. At the Poe Project, the primary concern related to ramping is downstream of Poe dam, where higher ramping rates could affect habitat in the bypassed reach. There is less concern at the powerhouse because, although fluctuating releases do occur, these releases are made into a tailrace that enters the upper end of Big Bend reservoir, which acts as a re-regulating reservoir, modulating stage changes. The current license has no ramping rate restrictions, but the applicant is proposing ramping rates at the Poe dam when ramping can be controlled at spill flows less than 3,000 cfs. The proposed ramping rates (as measured at the Pulga USGS gage, about 1.6 miles downstream of the dam) are as follows:

- March, April, and May – 250 cfs/hour up-ramp and 150 cfs/hour down-ramp;
- June 1 to June 15 – 300 cfs/hour up-ramp and 150 cfs/hour down-ramp; and
- Remainder of year – 400 cfs/hour up-ramp and 150 cfs/hour down-ramp.

FWS recommends and the Forest Service specifies (condition 24[5]) the following ramping rates:

- March through June – 250 cfs/hour up-ramp and 150 cfs/hour down-ramp; and
- Remainder of year – 400 cfs/hour up-ramp and 150 cfs/hour down-ramp.

Cal Fish and Game recommends that over the next 5 years the applicant develop a ramping schedule that moderates the “swift drop” in discharge that occurs in the Poe bypassed reach as the project gains control of the river flow following high-flow events.

Our Analysis

The ramping rates proposed by the applicant are the same ramping rates that were developed as part of the relicensing SA for the upstream Rock Creek-Cresta Project, and apply only to spillage flows less than 3,000 cfs. This reflects the difficulty in making small incremental flow adjustments during high flow events, when flows are near or greater than the capacity of the powerhouse (which is about 3,700 cfs). At spillage flows below 3,000 cfs, the flow through the two turbines are rarely adjusted to assist in reducing both up and down-ramping in flows released from the dam, because reducing powerhouse flow may prolong the spill but not achieve the desired result of a moderate flow recession. At flows greater than the hydraulic capacity of the powerhouse, the powerhouse continuously generates at full capacity, and releases from the dam are primarily controlled by the radial gates. However, given the relatively small storage volume of Poe reservoir, control of higher flows may be quickly limited by available storage volume and result in uncontrolled spillage at the dam. The effects of ramping on aquatic biota, however, are typically more serious at lower flows, when biota are more likely to be within the shallow-water habitat areas that would be susceptible to dewatering during down-ramping, or not find protection during up-ramping. Up-ramping at higher flows could also result in increased erosion, or scouring of gravels and vegetation.

PG&E’s proposed ramping rates are similar to those recommended by FWS and specified by the Forest Service, with up-ramping in the 250 to 400-cfs/hour range, and down-ramping at 150 cfs/hour. The only difference between the PG&E and the agency-recommended ramping rates is that PG&E is proposing an intermediate 300-cfs per hour rate for June 1-15, while the agencies would maintain 250 cfs/hour through June.

Cal Fish and Game recommended that the applicant develop a ramping rate plan. During discussions at the November 2006 section 10(j) meeting, it became evident that implementing ramping rates at Poe dam is a complex issue. Ramping rates at Poe dam are heavily influenced by ramping operations at the upstream Rock Creek-Cresta Project, which can often not be well controlled by PG&E. Therefore, a ramping rate plan at Poe dam would allow for better long-term coordination with ramping at Rock Creek-Cresta.

Interim ramping rates, however, would offer interim protection for aquatic resources while the ramping rate plan is developed. The rates recommended by FWS and specified by the Forest Service would offer adequate protection for most aquatic resources, although our analysis of potential effects on FYLF indicates that more appropriate up-ramping rates would be 250 cfs/hour from March 1 through September 30, to protect all breeding life stages of FYLF, and 400 cfs/hour from October 1 through the end of February. Down-ramping rates 150 cfs/hour year-round should be adequate, as recommended by the agencies. These ramping rates would be provided at spillage flows under about 3,000 cfs, the point at which PG&E has some control of the river.

Erosion at the Bardee's Bar Spoil Pile

The adit no. 1 spoil pile located at Bardee's Bar is composed of natural bedrock material excavated during the construction of the diversion tunnel between the Poe dam and Poe powerhouse. The estimated volume of the material is 500,000 to 600,000 cubic yards, with visual survey size estimates for most material in the 1- to 6-foot range (angular material) covered with a 1- to 3-foot deep layer of finer material, probably placed there during final clean-out of the adits.

During low-flow periods, the river flow is approximately 4 to 5 feet below the toe of the pile, and the lower face of the pile has been capped with a thin face of concrete. The spoil pile has been sloped to the northwest corner to a depression that carries runoff to the NFFR. Erosion and erosion cut channels are evident on the face of the spoil pile along the entire length.

The spoil material was evaluated for 17 trace metals (California Administrative Manual listed metals, CAM-17) using the Total Threshold Limit Concentration and Soluble Threshold Limit Concentration methodology. Testing of both spoil materials and NFFR background concentrations of trace metals both upstream and downstream of the spoil pile were completed. Water sampling results showed no significant difference in trace metals from upstream to downstream of the Bardee's Bar spoil pile, and no discernable elevated concentrations of trace metals that could be attributed to the spoil pile were observed.

The Forest Service specifies (condition no.33) that the Bardee's Bar spoil pile be re-vegetated after its approval of a plan and that re-vegetation be monitored to ensure successful implementation of the plan. The applicant also proposes to revegetate the spoil pile as an option for improving the aesthetics of the reach.

Our Analysis

The Bardee's Bar spoil pile shows significant evidence of erosion of materials along the entire face of the spoil pile. With the exception of the concrete face at the bottom of the spoil slope, no attempt at standard erosion and sediment control slope

protection appears to have been used on the spoil pile. Erosion channels are visible throughout the pile, and these channels would likely increase in size and sediment transport capacity over time, with continued exposure to the weather. A comprehensive application of appropriate erosion and sediment control techniques, including establishing vegetation along the slope, could provide long term stabilization of the spoil pile. Although there is no indication that runoff from the spoil pile is adversely affecting water quality, stabilization of the pile would be appropriate to reduce the potential for future severe erosion or mass movement that could affect water quality by releasing fines or previously undetected contaminant “hot spots” that could be exposed by any such mass movement.

We analyze the costs of measures proposed or recommended for water resources in section VI, *Developmental Analysis*, and make our final recommendations in section VII, *Comprehensive Development and Recommended Alternative*.

c. Cumulative Effects:

Water Quantity

Construction of the Poe Project and other water resource developments in the NFFR has greatly influenced the hydrology of the NFFR, including the Poe Project reach of the river. Discharges throughout the NFFR basin have been affected by dam construction, starting well before the water resources of the basin were used to generate electricity. The first dams in the basin were built for mining purposes, with water supply dam construction dating as far back as 1865 for a small reservoir (Round Valley Lake) constructed on a tributary to the East Branch of the NFFR. The largest reservoir in the upper basin, Lake Almanor, started operation in 1913. Consumptive water uses in the upper NFFR basin include domestic water supply, limited industrial uses, fire protection, and irrigation.

Changes in the hydrology of the NFFR basin that have resulted from the construction of the reservoirs include a decrease in the peak flow rate, due to the storage capability of the reservoirs, and somewhat higher flows during the low flow period in the summer and early fall. Storage from the upstream reservoirs is typically released during this period to provide flows for hydroelectric generation and to provide water to irrigators and other water users in the lower basin, including the Central Valley. Because the effects of the reservoirs pre-date flow data for USGS gages in the basin, PG&E performed an Indicators of Hydrologic Alteration analysis to compare current discharges in the Poe reach to modeled discharges in the reach in an undeveloped condition, before construction of the upstream reservoirs and hydroelectric projects.

This analysis showed that the mean, median, maximum, and minimum flows in the Poe bypassed reach are substantially lower since the development of the upstream reservoirs and the start of project operations. For example, the mean annual flow has

been reduced from 3,169 to 896 cfs, the maximum annual flow has been reduced from 23,182 to 17,726 cfs,⁷ and the minimum annual 30-day low flow has been reduced from 671 to 55 cfs. In the bypassed reach, all 11 monthly median flows are also substantially lower under current conditions. In addition, the durations of the high-flow events are shorter than they were before the development of water resource projects in the basin. The Poe Project itself results in only minor regulation of the NFFR flows, because Poe reservoir has limited storage, and all flow diverted at Poe dam is returned to the river at the Poe powerhouse. Flow fluctuations from the powerhouse are dampened by the re-regulating effect of Big Bend dam and eliminated by the substantial (3.5 million acre-foot) storage of Oroville reservoir, immediately downstream of Big Bend dam.

The minimum instream flows and pulse flows specified by the Forest Service, recommended by FWS, Cal Fish and Game, and Butte County, and identified by staff would restore a more natural hydrology to the Poe reach of the NFFR. The minimum flows would provide a variable flow regime, similar to (but lower than) historical, pre-development conditions, while the pulse flows would provide a spring “freshet” during extended periods of low flows. These flows would increase available physical habitat, provide channel maintenance, and improve summer water temperatures in the bypassed reach as compared to existing conditions.

Ramping Rates and Upstream Project Operations

Construction of water resource developments on the NFFR have influenced not only the quantity of flow, as discussed above, but also the rate at which its flow changes, including in the Poe bypassed reach. These rate changes are the direct result of flow regulation made possible by project impoundments and implemented through associated project operations. The rate of change in the flow, especially the decreasing limb of the spring and early summer hydrograph, has also been affected. However, in addition to causing changes in flow rates, project operations, primarily reservoir storage, can also mute natural causes of short-term flow variations, such as those caused by winter rain or snow events and during the early snowmelt rising limb of the hydrograph, because some of the flow can be captured by the storage reservoirs. For example, during the snowmelt season (late spring and early summer), there is often a substantial natural diurnal flow variation in the NFFR flows. This diurnal variation can affect gate operations at dams including the Poe and Rock Creek – Cresta projects, due to the limited capability at those projects to respond to rapid variation in river stages and flow rates in the NFFR.

Diurnal flow variation is most pronounced on the largely unregulated East Branch of the NFFR, which flows into the NFFR in the Belden bypassed reach, just upstream of the Rock Creek-Cresta reservoir. The East Branch of the NFFR has a drainage area of about 1,025 square miles, over half of the 1,953 square mile drainage area at USGS gage

⁷This maximum annual flow may not include the 3,700 cfs that would be diverted to the powerhouse during normal operations at higher flow levels.

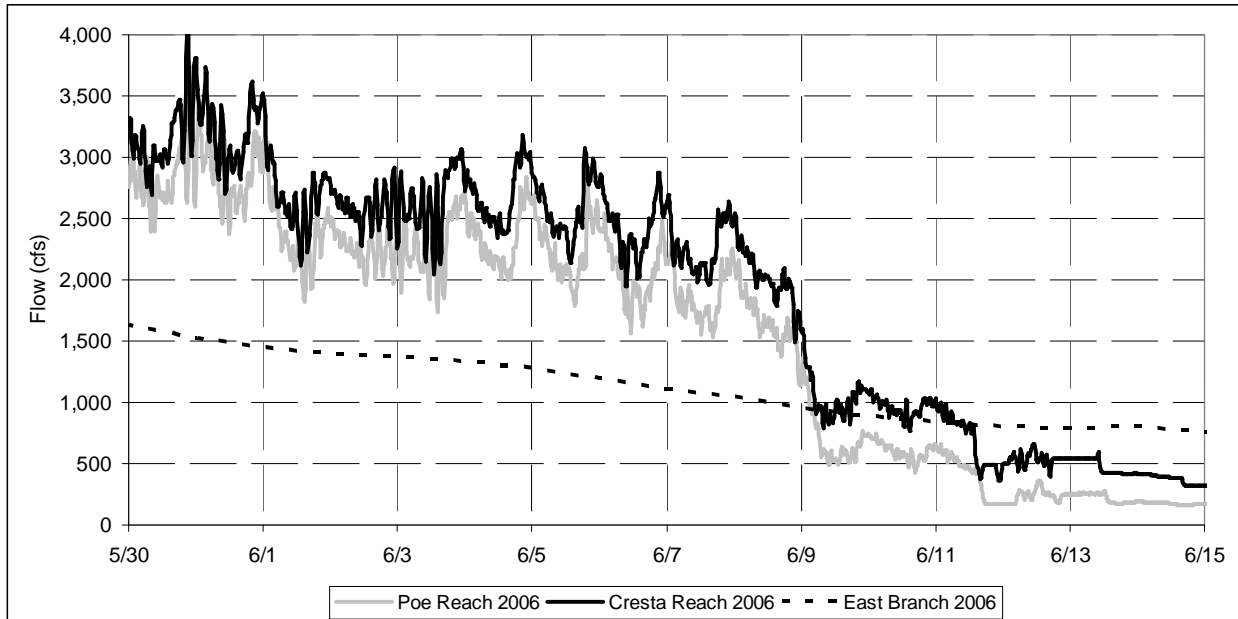
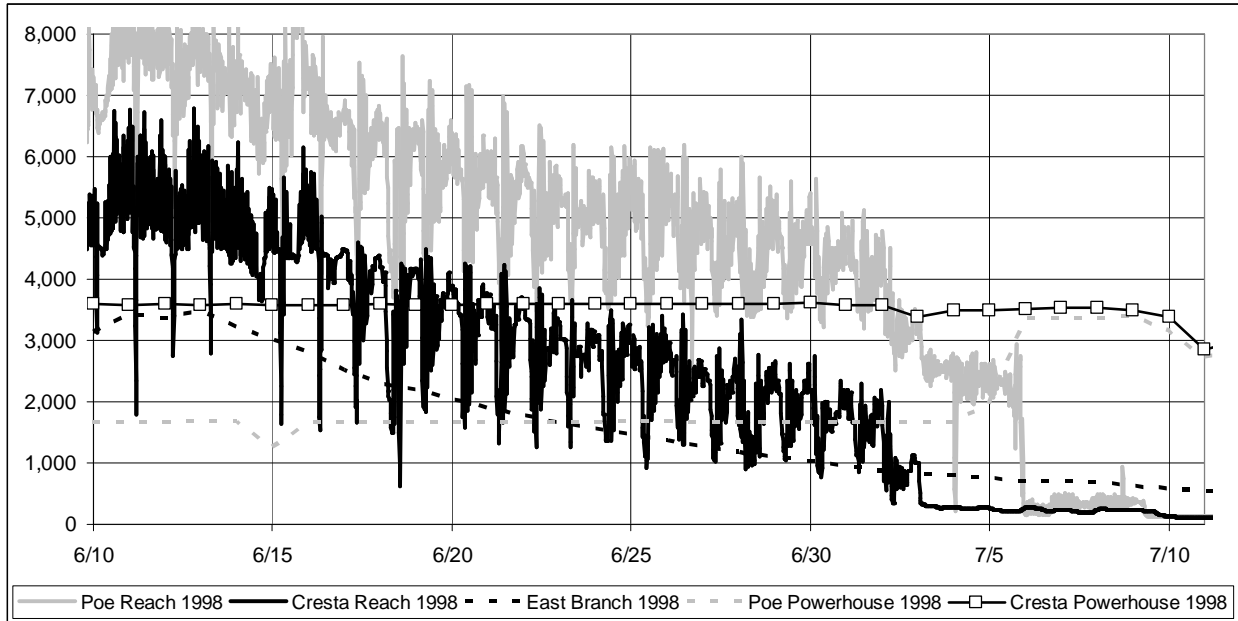
no. 11404500 NFFR near Pulga (PG&E gage no. NF23) within the Poe bypassed reach. The East Branch of the NFFR has the most undisturbed watershed within the NFFR and contains only the relatively small Round Valley Reservoir in its upper watershed. In the NFFR, the diurnal flow variation and other variations in the flow is most noticeable when the river flow is fluctuating and is above the hydraulic capacities of the powerhouses (3,700 cfs at Poe); both of these conditions are most common during a wet water year type such as 1998 or 2006. During wet years, this variation is carried over to the bypassed reaches due to limited storage capacity of the forebays and operational response limitations on gate operations at the dams. Based on flow data from the USGS for 1998, and verbal statements from PG&E during the November 28, 2006, 10(j) meeting, the flow through the Poe powerhouse typically remains relatively constant during these flow periods as shown in figure 7. An exception appears to be during early July of 1998 when discharge from the Poe powerhouse approximately doubles within a period of a few days, probably as a result of returning two turbines to operation, while only one turbine was in operation during most of the month of June. The maximum down ramping rate for the Poe bypassed reach as shown in figure 7 for July 5, 1998, is more than 1,000 cfs per hour. Other upstream operational procedures that affect flow in the Poe bypassed reach include gate setting changes at Canyon dam at Lake Almanor, non normal powerhouse operations, and environmental testing; all of which according to PG&E were partly responsible for the rapid decrease in flow in the NFFR around June 9, 2006. The maximum rate of change on June 9, 2006, was more than 100 cfs per hour.

Investigation of the flow records in the UNFFR area show that the operations, operational constraints, and human control within the watershed affect the ramping rates, especially in the Poe bypassed reach. These changes when compared to the natural predevelopment hydrograph, are probably substantially larger now since the development of the project and the other upstream hydropower operations.

Water Quality

As discussed in our analysis of project effects on water temperature, the primary water quality issue throughout the NFFR is summer water temperature and its effect on coldwater habitat suitability. The construction and operation of upstream hydroelectric projects and their reservoirs have generally increased summer water temperatures over historical conditions. Changes in operation of these projects have the potential to affect the temperature regime of the NFFR, and these changes may have positive or negative effects on downstream areas. For the Poe reach, the current failure to consistently meet water temperature goals during the summer months is primarily related to the temperature of water entering the upstream boundary of the Poe reach.

Figure 7. Flow during the late spring and early summer in the project area for 1998 and 2006. (Source: PG&E, 2006; and USGS, 2007; as modified by staff)



Notes:

Flow for Poe Reach as measured at USGS gage no. 11404500 NFFR near Pulga (PG&E gage no. NF23) 15 minute flow data. Flow for Cresta Reach as measured at USGS gage no. 11404330 NFFR below Grizzly Creek (PG&E gage no. NF56) 15 minute flow data. Flow at East Branch as measured at USGS gage no. 11403000 East Branch NFFR near Rich Bar, mean daily flow data. Flow at Poe powerhouse as measured at USGS gage no. 11404900 Poe powerhouse near Jarbo Gap, mean daily flow, data not available from the USGS for 2006. Flow at Cresta powerhouse as measured at USGS gage no. 11404360 Cresta powerhouse near Pulga, mean daily flow, data not available from the USGS for 2006.

The applicant-proposed, and agency or staff flow regimes would reduce summer water temperatures in the Poe bypassed reach and, as such, result in a beneficial cumulative impact that would affect the reach of the NFFR from Poe dam downstream to where it enters Lake Oroville, below Big Bend dam. Increased minimum flows at upstream projects (i.e., Rock Creek-Cresta and the UNFFR Project.) would serve to cool summer water temperatures over greater lengths of the NFFR, generally improving coldwater fisheries habitat.

The applicant has been monitoring the streamflow and temperature regimes in the Upper NFFR pursuant to relicensing of its other hydroelectric projects in the basin. PG&E made a commitment to study the potential effectiveness of measures for reducing water temperatures, including temperature control structures, as part of the Rock Creek-Cresta relicensing SA (PG&E, 2000), and to implement reasonable and practicable control measures. The implementation of any such measures would directly affect the temperature of inflows to the Poe Project and the temperature regime in the Poe reach. Further analysis and discussion of potential upstream temperature control measures is contained in Commission staff's final EIS for the relicensing of the UNFFR Project (FERC, 2005).

To evaluate the potential effect of reduced water temperatures in the inflow to the Poe Project, PG&E simulated (using the SNTMP temperature model) the effects of an upstream reduction in water temperatures of 1°C and 2°C. Tables 14 and 15 provide modeling matrix results with initial and inflow temperatures to the Poe Project bypassed reach reduced by 1°C and 2°C, respectively, to simulate the effects of cooler temperatures from upstream. With a 1°C decrease in initial and inflow temperatures and normal conditions, a bypass flow of 200 cfs would meet the 20°C maximum temperature target in all months, but a bypass flow of 1,250 cfs would be required to meet the 20°C target in all months during extreme conditions (table 14). With a 2°C decrease in initial and inflow temperatures and normal conditions, a bypass flow of 150 cfs would meet the 20°C temperature target in all months, but under extreme conditions a flow of 200 cfs would be required to meet the 20°C target in all months (table 15).

The results of the modeling indicate that cooler influent water temperatures have a substantial effect on reducing water temperatures in the Poe bypassed reach, allowing the 20°C target to be met at lower flows than would be required without cooler inflows, as shown in table 10. For ease of comparison, tables 14 and 15 include some of the results of the simulations from table 10.

Both the range of temperatures shown in table 10, as well as the lowest flow at which the 20°C target would be met, without cooler inflows, are presented in tables 14 and 15. This shows that with cooler inflows, the range of simulated temperatures is consistently lower than simulated temperatures with no cooling of the inflow. In addition, with a 1°C reduction in inflow temperatures (table 14), the target 20°C temperature can be reached with a bypass flow of 200 cfs in July and 150 cfs in August

Table 14. Results of SNTEMP modeling for the NFFR Poe bypassed reach, showing the predicted temperatures, in °C, with inflow temperature decreased by 1°C.
(Source: Woodward-Clyde, 1986; PG&E, 2003)

Flow Release	Normal Conditions				Extreme Conditions			
	June	July	August	September	June	July	August	September
50	19.5	21.9	21.4	18.1	21.1	22.8	22.0	19.2
100	18.6	20.8	20.5	17.6	20.3	21.5	21.3	18.6
150	18.1	20.2	20.0	17.3	19.9	21.0	20.9	18.3
200	17.8	19.8	19.7	17.2	19.7	20.7	20.7	18.2
300	17.5	19.5	19.4	17.0	19.4	20.3	20.5	18.0
500	17.2	19.2	19.1	16.9	19.1	19.9	20.3	17.8
850	17.0	18.9	18.9	16.8	19.0	19.6	20.1	17.7
1,250	16.9	18.8	18.8	16.7	18.9	19.5	20.0	17.6
Range of simulated temp. from table 10	17.9-19.8	19.7-22.2	19.7-21.7	17.6-18.5	19.8-21.4	20.4-23.1	20.9-22.3	18.6-19.5
Lowest flow at which 20°C target is met - table 10	50	500	500	50	500	none	none	50

Table 15. Results of SNTEMP modeling for the NFFR Poe bypassed reach, showing the predicted temperatures, in °C, with inflow temperature decreased by 2°C.
(Source: Woodward-Clyde, 1986; PG&E, 2003)

Flow Release	Normal Conditions				Extreme Conditions			
	June	July	August	September	June	July	August	September
50	19.1	21.5	21.1	17.7	20.8	22.5	21.7	18.8
100	18.0	20.2	19.9	17.0	19.8	21.1	20.7	18.0
150	17.5	19.6	19.4	16.6	19.3	20.4	20.3	17.6
200	17.1	19.2	19.0	16.4	19.0	20.0	20.0	17.4
300	16.7	18.7	18.6	16.2	18.6	19.5	19.7	17.2
500	16.4	18.3	18.3	16.0	18.3	19.0	19.4	16.9
850	16.1	18.0	18.0	15.8	18.0	18.7	19.2	16.8
1,250	16.0	17.9	17.9	15.8	17.9	18.5	19.1	16.7
Range of simulated temp. from table 10	17.9-19.8	19.7-22.2	19.7-21.7	17.6-18.5	19.8-21.4	20.4-23.1	20.9-22.3	18.6-19.5
Lowest flow at which 20°C target is met - table 10	50	500	500	50	500	none	none	50

under normal conditions, compared to 500 cfs with no cooling of the inflow. Similarly, under extreme July and August conditions, with a reduction in inflow temperature of 1°C, the 20°C target can be met with a flow of 500 cfs in July and 1,250 cfs in August, while none of the modeled flows would reach the target with no cooling of the inflow. Reducing inflow temperatures by 2°C would allow for even further cooling of

temperatures in the reach and smaller bypass flows to meet the temperature target (table 15), further reducing the cumulative effects of hydropower project operations on summer water temperatures in the NFFR.

d. Unavoidable Adverse Effects:

None.

2. Aquatic Resources

a. Affected Environment:

Poe Project Aquatic Habitats

Poe Reservoir

The Poe reservoir functions primarily as a regulating forebay for hydroelectric generation at the Poe powerhouse. From the Poe dam, the reservoir extends about 1.7 miles upstream to the lower end of the Cresta powerhouse tailrace. Due to its small size (approximately 53 acres) and gross storage capacity (1,203 acre-feet), the reservoir has the hydrologic characteristics of an oversized pool and run complex, rather than a storage impoundment. It is long and narrow with maximum widths of about 400 feet near the dam and 150 feet at the head of the reservoir. Because of the large volume of water entering Poe reservoir from the Rock Creek-Cresta powerhouse and the reservoir's riverine nature, it is well mixed and exhibits minimal thermal stratification. Due to its limited size and the high volume of inflow, residency time for Poe reservoir water is short. Changing electrical demand in PG&E's service area and resulting flow through upstream hydroelectric projects can cause daily reservoir water surface elevation fluctuations of 3 feet. The hydraulic capacity of the two generating units at the Poe Project powerhouse is 3,700 cfs.

Poe Bypassed Reach

The Poe bypassed reach is 7.6 miles long and extends from the Poe dam downstream to the Poe powerhouse. During normal operation of the project, the majority of water exiting Poe reservoir is diverted into a 6.4-mile long penstock and tunnel system. Water is then discharged at the Poe powerhouse into Big Bend reservoir. In contrast to the high gradient reaches of the NFFR upstream of the Poe dam, the gradient of the Poe bypassed reach drops more gradually, descending approximately 65 feet per river mile. The reach begins as a wide channel, with a slight gradient from the Poe dam to a point immediately downstream of the mouth of Flea Valley Creek, a distance of about 5,350 feet (1.01 river miles). The river then enters a narrow, steep canyon dominated by bedrock canyon walls and large boulders; this section continues for approximately 13,360 feet (2.53 miles) and ends at Bardee's Bar. The river then becomes wide and flat with long pools, runs, and pocket water separated by short sections of riffles and cascades; this

lower section extends from Bardee's Bar to the Poe powerhouse, an approximate distance of 21,560 feet (4.08 miles). All three sections of the reach are dominated by large pools, which are deeper in the middle canyon section and shallower in the upper and lower sections.

The existing minimum flow requirement for the bypassed reach has two components: (1) a minimum release of 25 cfs from Poe dam, and (2) the release of additional water, as needed, to ensure an instream flow of 50 cfs at the NF23 (Pulga) gage, which is located about 1.6 miles downstream of the dam. Increased leakage in recent years from the radial gate seals at the dam has resulted in instream flows that average approximately 110 cfs at the NF23 gage. In response to runoff events, flows in the bypassed reach are often substantially higher than the 50-cfs minimum instream flow requirement, because of the small storage capacity of Poe reservoir and limited hydraulic capacity of the powerhouse, which result in regular spill events, especially during normal rainy winter months and months with increased run-off from spring snowmelt. Mean monthly flow values from 1968-2003 in the bypassed reach ranged from 68 cfs in August to 1,899 cfs in March. Median flows ranged from 60 cfs in July, August, and October to 168 cfs in March (see section V.C.1, *Water Resources*).

Big Bend Reservoir

Big Bend reservoir is located immediately below the Poe powerhouse and was created by the construction of Big Bend dam in the early 1900s. Big Bend dam impounds water for a distance of approximately 4,500 feet upstream to the Poe powerhouse tailrace. The reservoir is shallow with minimal water volume and thus functions similarly to a continuous run. The reservoir is between 200 and 250 feet wide for its entire length.

Fluctuation of the elevation of Big Bend reservoir has the potential to affect fishery resources in the reservoir through the disruption of spawning activity, stranding, and displacement. Surface water elevation is tied directly to the operation of the two turbines at the Poe powerhouse, and can vary rapidly depending on the speed with which operational changes are made. Large-scale variations in water surface elevation can also occur during the spring when water is spilled into the Poe Project bypassed reach during high flows. To reduce the effects of fluctuations from project related discharges on Big Bend reservoir, a notch was cut in Big Bend dam in 1967 that allowed some water to spill at a lower elevation, helping to maintain more stable but somewhat lower reservoir elevations. The elevation of Big Bend reservoir can also be influenced by operation of the Oroville Project, which is the next downstream project on the NFFR. When Lake Oroville is full, its impoundment extends up the NFFR and can crest over the Big Bend dam during high water years. When water level in Lake Oroville is high enough to overtop Big Bend dam, flow fluctuations in Big Bend reservoir are further reduced. Because PG&E is proposing to incorporate the lands adjacent to Big Bend dam into the Poe Project boundary, this reservoir is discussed as a project feature.

Mill Creek and Flea Valley Creek

The Poe Project bypassed reach has two primary tributaries, Mill Creek and Flea Valley Creek, which enter the NFFR between Poe dam and the Highway 70 bridge, about 1 mile below the dam. The combined inflow from these tributaries into the project bypassed reach can be significant during the late spring and early summer, especially when the main river is under the control of PG&E (i.e., at the minimum release level from Poe dam). However, by late summer and fall in normal years, Mill Creek flow can be as low as 3 cfs, and flow in Flea Valley Creek can be as low as 0.5 cfs. Both creeks are considered important spawning and rearing areas for rainbow trout, although a Highway 70 culvert near the mouth of Mill Creek is an upstream migration barrier under many flow conditions.

Fishery Resources

During the 1930s and 1940s, the NFFR was known as a premier trout fishing river. By the 1960s and 1970s, however, the NFFR fish community consisted primarily of nongame fish that managed to persist under the changing riverine conditions associated with anthropogenic activity in the watershed, including the construction of a system of dams, highway and road construction along the Highway 70 corridor, and other land management practices (Li and Enplan, 1994). Warm water temperature, reduced flow, and increased pool habitat likely improved conditions for native nongame species such as hardhead and Sacramento sucker, which at the same time reduced optimal conditions for rainbow and brown trout. In recent years, several attempts have been made by Cal Fish and Game to improve the trout fishery by installing fish barriers, fish stocking, and by applications of rotenone targeted at nongame species (Li and Enplan, 1994).

Wild and hatchery raised Central Valley spring-run Chinook salmon, Central Valley fall-run Chinook salmon, and Central Valley steelhead return annually to the Feather River to spawn; however, their migratory route is blocked downstream of the Poe Project facilities at the Feather River fish hatchery dam, which is approximately 5 river miles downstream of Oroville dam, both of which are components of the Oroville Project. Prior to water resource development and gold mining in the region in the middle 1800s and early 1900s, the NFFR was considered to be a “major anadromous fish channel” containing large runs of Central Valley spring-run Chinook salmon (Yoshiyama et al., 2001). Although the major spawning grounds for salmon were believed to be contained within the first 30 river miles of the Feather River (Yoshiyama et al., 2001), reportedly thousands of Central Valley spring run Chinook salmon migrated farther upstream into the NFFR and its tributaries. Spring-run Chinook salmon were noted to ascend the full length of the NFFR, through the area currently impounded by Canyon dam (Lake Almanor – FERC No. 2105), and into surrounding tributaries. Historically, Central Valley steelhead may have also occurred in the upper NFFR, although their historic distribution is not well understood (Yoshiyama et al., 2001).

The first man-made blockages to salmon runs in the NFFR were likely associated with gold mining operations. Hydraulic mining altered the river's physical and hydrologic processes resulting in dewatered river beds, increased sediment loads, high turbidity, and physical alterations to gravel and cobble beds. Dramatic increases in sediment load and turbidity because of mining operations in major tributaries of the Sacramento River, including the Feather River, were thought to be one of the major factors affecting salmon runs during the late 19th and early 20th centuries (Yoshiyama et al., 2001). Additional development in the watershed related to the construction of a system of hydroelectric dams, highway and road construction along the Highway 70 corridor, and various land management activities in the early and middle 20th century further exacerbated the decline of salmonids in the Feather River watershed (Li and Enplan, 1994; Yoshiyama et al. 2001). The construction of Big Bend dam in 1910 upstream of present-day Lake Oroville was the first major man-made migratory barrier constructed on the NFFR. The construction of Canyon dam in 1914 (and a second dam replacing it in 1927), Rock Creek dam (1950), Cresta dam (1950), Poe dam (1958), and Oroville dam (1963) created additional migratory barriers in the NFFR.

Currently, twelve species of fish are reported from waters associated with the Poe Project (table 16). Other species may occur in the project area because of drift from upstream reservoirs where additional species are known to occur. Several unidentified cyprinids (minnows) were reported during fisheries surveys conducted by PG&E as part of the relicensing effort, indicating that species diversity may be higher than currently reported in the final license application. Recent data from studies conducted in the waters associated with the Poe Project indicate that present conditions are suitable for the maintenance of native and introduced sport and nongame fishes, including hardhead, pikeminnow, and rainbow trout.

Movement of resident fish into and out of project waters occurs during upstream spawning migrations, natural dispersal mechanisms, and involuntary downstream movement due to high winter or spring flood flows. When Lake Oroville is high, fish are able to move upstream from Lake Oroville into the Poe Project tailrace and bypassed reach through a permanent notch in Big Bend dam. It is also likely that fish from upstream enter Poe reservoir by passage through upstream hydroelectric facilities during high flow events.

Poe Bypassed Reach

Snorkeling surveys were conducted by Li and Enplan in 1994 and repeated by PG&E in 1999 and 2000 to assess the distribution, abundance, and composition of the fish community in the Poe bypassed reach. During PG&E's assessment, four sites were sampled in the bypassed reach to characterize fish species composition. All fish were enumerated and identified by divers moving in an upstream direction. The results of the surveys indicate that the project area supports a mixture of coldwater and coolwater

Table 16. Fish species known or likely to occur in waters of the Poe Project. (Source: PG&E, 2003, as modified by staff)

	Poe Reservoir	Poe Bypassed Reach	Big Bend Reservoir
Native Species			
Rainbow trout	X	X	X
<i>Oncorhynchus mykiss</i>			
Sacramento sucker	X	X	X
<i>Catostomus occidentalis</i>			
Sacramento pikeminnow	X	X	X
<i>Ptychocheilus grandis</i>			
Hardhead	X	X	X
<i>Mylopharodon conocephalus</i>			
Riffle sculpin		X	
<i>Cottus gulosus</i>			
Speckled dace		X	
<i>Rhinichthys osculus</i>			
Introduced Species			
Brown trout		X	
<i>Salmo trutta</i>			
Smallmouth bass	X	X	X
<i>Micropterus dolomieu</i>			
Largemouth bass	X		
<i>Micropterus salmoides</i>			
Common carp	X		
<i>Cyprinus carpio</i>			
Spotted bass ^a	-	-	-
<i>Micrpoterus punctulatus</i>			
Brown bullhead ^a	-	-	-
<i>Ameiurus nebulosus</i>			

- ^a The current distribution of these species in the NFFR is not well known nor were these fish captured in recent surveys conducted by PG&E in the Poe Project area; however, they are known to occur in portions of the NFFR watershed upstream of the project and thus may occur in waters associated with the Poe Project.

species, game and nongame species, and introduced species (table 17). Li and Enplan's 1994 survey indicated that the Poe bypassed reach was dominated by nongame and non-native sport fish including Sacramento pikeminnow, smallmouth bass, and Sacramento sucker. Rainbow trout made up approximately 8 percent of the catch during the 1992 survey (table 17); however, snorkeling surveys from 2000 indicate that the reach was dominated by rainbow trout (table 17).

Table 17. Fish sampling results from 1992, 1999, and 2000 in the Poe bypassed reach, NFFR, California. (Source: PG&E, 2003, as modified by staff)

Species ^a	Sample Date					Total Catch
	1992 ^b (October)	1999 ^c (July)	1999 ^c (October)	2000 ^c (June)	2000 ^d (September)	
Hardhead	3 (0.5%)	38 (1.7%)	54 (8.8%)	6 (0.4%)	86 (27.5%)	187
Pikeminnow	121 (19.8%)	96 (4.3%)	155 (25.3%)	67 (4.1%)	16 (5.1%)	454
Sacramento sucker	198 (32.5%)	1686 (75.5%)	298 (48.7%)	603 (37.2%)	118 (37.7%)	2901
Rainbow Trout	48 (7.9%)	332 (14.9%)	100 (16.3%)	915 (56.4%)	1 (0.3%)	1395
Smallmouth bass	238 (39.0%)	35 (1.6%)	1 (0.2%)	14 (0.9%)	83 (26.5%)	370
Common carp	2 (0.3%)	2 (0.1%)	0 (0%)	4 (0.2%)	3 (1.0%)	11
Speckled dace	0 (0%)	43 (1.9%)	2 (0.3%)	11 (0.7%)	0 (0%)	56
Riffle sculpin	0 (0%)	1 (0.04%)	2 (0.3%)	1 (0.1%)	6 (1.9%)	10
Total No. Fish Observed	610	2233	612	1621	313	5389

^a All size classes and all sampling stations combined.

^b Li and Enplan (1994).

^c PG&E snorkeling surveys.

^d Data from large pool electrofishing and gill net surveys.

The surveys indicate that species distribution in the bypassed reach varies by habitat type. Sacramento sucker was the most abundant species in all habitat types sampled (e.g., pools, runs, riffles, and pocket water). Hardhead and Sacramento pikeminnow were found more frequently in lower velocity pools and runs, and rainbow trout were found predominantly in higher velocity riffles, runs, and in pocket water. PG&E also conducted large-pool sampling in several large pools in the bypassed reach in 2000 to further evaluate fish species composition. Because the selected pools were too deep to survey with snorkelers, a barge electrofishing boat-gill net combination methodology was used. Results from the survey indicate that deep pools in the Poe reach were dominated by hardhead, Sacramento sucker and, and smallmouth bass (table 17).

Reservoir Fish Community

Gill net surveys and boat electrofishing surveys conducted in the Poe and Big Bend reservoirs by Li and Enplan (1994) and by PG&E (2000) indicate that hardhead, Sacramento sucker, and smallmouth bass are the predominant species in the two project reservoirs (table 18). Inlet trapping data for Poe reservoir collected by Cal Fish and Game in 1981 and 1982 indicated that rainbow trout comprised a substantially larger percentage of the fish assemblage in the 1980s than indicated by more recent surveys. The surveys conducted in 1992 and 2000 suggest that the relative percentage of rainbow trout in Poe reservoir is small (table 18).

Table 18. Fish sampling results from the Poe and Big Bend reservoirs, Poe Project, NFFR, California. (Source: PG&E, 2003, as modified by staff)

Species	Poe Reservoir			Big Bend Reservoir	Total Catch
	1981-1982 ^a	1992 ^b	2000 ^c	2000 ^c	By Species
Hardhead	27	45	36	86	194
Pikeminnow	28	9	5	10	52
Sacramento sucker	135	33	7	38	213
Rainbow trout	118	2	2	1	123
Brown trout	10	0	0	0	10
Smallmouth bass	20	26	15	11	72
Riffle sculpin	0	0	2	2	4
Largemouth bass	0	1	0	0	1
Total Catch	338	116	67	148	669

^a Cal Fish and Game reservoir inlet trapping data, as reported by PG&E (both years combined).

^b Li and Enplan (1994).

^c PG&E license application surveys.

Major Tributaries

In 1999, PG&E conducted backpack electrofishing surveys of Flea Valley Creek and Mill Creek. In Flea Valley Creek, approximately 82 percent of the rainbow trout were young-of-the-year fish, indicating that Flea Valley Creek provides important spawning and rearing habitat. Electrofishing surveys indicate that Mill Creek is also dominated by rainbow trout, although small numbers of brown trout were also captured (3.4 percent of total catch) during the 1999 survey. Mill Creek provides some spawning and rearing habitat for rainbow trout, although a Highway 70 culvert near the mouth of the creek acts as a migration barrier under many flow conditions. Natural falls on Mill Creek approximately 1,500 feet upstream of the Highway 70 culvert prevent further upstream migration for fish at all flows.

Special Status Aquatic Species

Hardhead, a California species of special concern and a designated Forest Service sensitive species for the Plumas National Forest, is known to occur in the Poe Project area. Sacramento perch (*Archoplites interruptus*), another California species of special concern, is known to occur upstream and has the potential to occur in project waters if individual fish move downstream.

The hardhead is a large native minnow endemic to the Sacramento River and San Joaquin River watersheds. An omnivorous species that feeds on plankton, aquatic plants, and invertebrates, hardhead are typically most abundant in larger, middle, and low elevation well-oxygenated stream reaches where summer temperatures typically exceed 20°C (Moyle, 2002).

Sacramento perch were historically widespread in the Sacramento, San Joaquin, Pajaro, and Salinas rivers and in Clear Lake (Lake County) of California, but have been extirpated from most of their historic range (Moyle, 2002). This species has been out-competed in the Central Valley by introduced centrarchids (e.g., bluegill, crappie, largemouth, smallmouth, and spotted bass). Its current distribution is limited to isolated reservoirs, farm ponds, or highly alkaline reservoirs where they do well. Preferred habitat consists of beds of rooted and emergent aquatic plants, which are critical for food and as cover for juveniles. Although Sacramento perch have not been documented in the Poe Project area, populations do exist in reservoirs in the upper NFFR drainage (e.g., Lake Almanor). Individuals could be transported downstream to the Poe Project area during high flow periods or through other natural or unnatural displacement mechanisms (e.g., entrainment at upstream projects).

No fish species currently listed or proposed for listing under either the ESA or the California Endangered Species Act are known to occur in the project area.

Macroinvertebrates

Macroinvertebrate sampling was conducted throughout the Poe bypassed reach from 1999 to 2002 to characterize species diversity and species richness and to evaluate the applicability of the California Stream Bioassessment Procedure for assessing the effects of changes in flow regimes on macroinvertebrate communities. All macroinvertebrate sampling was conducted in riffle habitat with stable cobble or boulder substrate. In 1999, as part of a NFFR basin-wide survey to establish baseline conditions, one site was sampled in the Poe bypassed reach (Pulga). In subsequent years, two additional sites were surveyed in the Poe bypassed reach, Bardee's Bar and the Poe powerhouse reach (table 19). Benthic macroinvertebrates were sampled with a modified stream sampling net. The metrics generated from the 2000 – 2002 data were presented in four general categories: (1) species richness and diversity measures, (2) EPT composition measures, (3) tolerance/intolerance measures, and (4) functional feeding group measures.

Species richness is an important metric because it is reflective of habitat availability and is indicative of the stability of the benthic macroinvertebrate community. Based on the classification scheme presented in the license application, mean species richness values less than 31 were considered to be poor, values between 31 and 35 were considered to be fair, values ranging from 36 to 40 were considered to be moderate, and values greater than 40 were considered to be good.

Species diversity, another metric that can be used to describe the level of impairment of a riverine system, is a measure of the number of species present in relation to the evenness of the species composition. A community with an equal (even) number of species and higher species diversity is considered to be less impaired than a community dominated by a few species. For the Poe bypassed reach, species diversity values greater than 3.01 were classified as moderate, while values above 3.51 were classified as good.

PG&E calculated two additional metrics based on the percentage of EPT present in the entire sample: (1) an EPT index (percent of all EPT present), and (2) a sensitive EPT index (percent of sensitive EPT species present). Because many species within the orders Ephemeroptera and Tricoptera are tolerant to disturbance, the sensitive EPT index is based largely on the percentage of sensitive organisms in the order Plecoptera. PG&E also examined the relative abundance of functional feeding groups (e.g., percentage of collector/gathers, filterers, shredders) to assess the "health" of the macroinvertebrates within the Poe reach. This metric is based on the premise that the percent of shredders is expected to decline with declining water quality.

In general, the Poe bypassed reach supports a diverse assemblage of macroinvertebrate species whose biological metrics rank between fair and good as defined by the California Stream Bioassessment Procedure (GANDA, 2003). Results

from the Poe reach benthic macroinvertebrate surveys indicate that species diversity is representative of moderate to good conditions, and has not been adversely affected by project operations (table 19). Species richness is representative of poor to good conditions (table 19).

Table 19. Characteristics of the aquatic macroinvertebrate community in the Poe bypassed reach from 1999 to 2002, NFFR, California. (Source: PG&E 2003, as modified by staff)

	1999	2001	2002
Pulga Reach			
Species Richness (total/mean)	69/45	54/38	53/36
Mean Species Diversity (H) ^a	4.18	3.87	3.52
EPT Species (total/mean)	27/19	16/12	17/12
EPT Index	61.8	52.5	53.0
Bardee's Bar Reach			
Species Richness (total/mean)	49/33	38/27	54/34
Mean Species Diversity (H) ^a	3.4	2.98	3.25
EPT Species (total/mean)	21/16	16/12	20/14
EPT Index	78.8	61.7	75.7
Poe Powerhouse Reach			
Species Richness (total/mean)	51/35	42/28	62/40
Mean Species Diversity (H) ^a	3.88	3.10	3.62
EPT Species (total/mean)	21/17	10/8	20/14
EPT Index	60.7	55.2	59.1
Poe Reach Total			
Species Richness (mean)	38	31	37
Mean Species Diversity (H) ^a	3.82	3.31	3.46
EPT Species (mean)	17	11	13
EPT Index	67.1	56.4	62.6

^a Brillouin Diversity Index Values.

Riverine Habitat Characteristics

Aquatic Habitat Classification

Aquatic habitat was mapped in 1999 in advance of an instream flow incremental methodology (IFIM) study that was conducted by PG&E in 2000. The survey indicated that the predominant riverine habitat types in the Poe bypassed reach include pools, runs, cascades, high gradient riffles, low gradient riffles, and pocket water. In general, the reach is dominated by pools, which make up approximately 57 percent of all habitat types (table 20). Runs and pocket water (fast flowing water strewn with boulders that creates “pocket water”) are the next two most predominant habitat types in the reach (table 20).

Table 20. Relative percentage of habitat types in the Poe bypassed reach, NFFR, California. (Source: PG&E, 2003, as modified by staff)

Habitat Type	Upper Sub-reach	Middle Sub-reach	Lower Sub-reach	Poe reach Total
Pool	57%	58%	57%	57%
High Grade Riffle - Cascade	4%	14%	8%	10%
Low Grade Riffle	6%	1%	5%	4%
Runs	28%	6%	19%	16%
Pocket Water	5%	21%	11%	13%

Large Woody Debris

Studies conducted by PG&E indicate that there is limited large woody debris (LWD) present in the Poe bypassed reach. The number of LWD pieces (defined by the investigators as greater than 3 feet in length and 6 inches in diameter) averages 2.93 pieces/0.6 mile. The majority of LWD found throughout the reach falls into the smallest size classes, indicating that it provides little geomorphic function. According to the applicant’s study, LWD is moved through the system quickly as the confined bedrock dominated nature of the system, combined with frequent high flows, limits anchoring and subsequent habitat and channel formation processes (Stillwater Sciences, 2003). According to NMFS (1996), properly functioning riverine systems typically contain approximately 20 pieces of LWD per mile that is more than 12 inches in diameter and 35 feet in length

Spawning Gravel Availability

Gravel mapping efforts were conducted by PG&E in 1992, 1999, and in 2003 to assess the distribution and abundance of spawning sized gravels (4 to 150 millimeters [mm]) for salmonids in the Poe bypassed reach. These surveys indicate that gravel availability in the upstream sub-reaches is likely a function of the ability of Poe dam to pass sediment through its low-level gate, as well as from the contribution of gravels from Flea Valley Creek and Mill Creek. Estimates of the amount of available spawning gravel in the Poe bypassed reach range from 99,470 to 124,122 square feet at flows of approximately 90 to 160 cfs. Spawning gravel accessibility increases as gravels outside the normal wetted channel become available at higher flows. Estimates of total gravel availability in the channel, which could become available during higher flows, ranged from 136,854 to 415,377 square feet. An additional 3,285 square feet of suitable spawning gravel is available in Flea Valley and Mill creeks.

Water Temperature

The Water Board, Cal Fish and Game, and the FWS have targeted a daily mean water temperature in the NFFR of less than or equal to 20°C to protect coldwater fish habitat, which is a designated beneficial use of the NFFR. Data collected from six stations throughout the Poe bypassed reach in 1999, 2000, and 2003 indicate that water temperatures ranged from 10.4 to 26°C during the 3 years of data collection. Water temperatures for the same period ranged from 9.7 to 18.7°C in Mill Creek and from 8.7 to 19.4°C in Flea Valley Creek. Water in the Poe bypassed reach warms noticeably as it progresses downstream and is warmer than inflowing tributaries. Cold water inflow from Mill Creek and Flea Valley Creek lessens the likelihood of extremely high water temperatures in the upper bypassed reach. The canyon-like topography in the upper bypassed reach also assists with the maintenance of colder water in the main stem, as direct exposure to solar radiation is more limited, compared to downstream reaches. Farther downstream, near Bardee's Bar and the Poe powerhouse, the low gradient and less shaded reaches of the NFFR result in warmer water temperatures.

b. Environmental Effects:

Minimum Instream Flow Schedule

Physical Habitat

The existing instream flow requirement for the Poe bypassed reach is 50 cfs as measured at the Pulga gage (NF23), located approximately 1.6 miles downstream of the Poe dam. Increased leakage in recent years from the radial gate seals at the dam, however, has resulted in bypassed reach minimum flows of around 110 cfs.

PG&E proposes to implement a continuous minimum instream flow in the bypassed reach of 150 cfs as measured at the NF23 gage. Alternatively, the Forest Service specified (condition 24[1]) a flow schedule that would vary on a monthly basis and would be based on annual water year classifications. The Forest Service's flow schedule would range from 150 cfs in October, November, December, and January of critically dry water years to 425 cfs in May of wet water years (see table 9 in section V.C.1, *Water Resources*).

Interior and Cal Fish and Game's initial flow recommendation was identical to that specified by the Forest Service. However, in their comments on the draft EA, Interior and Cal Fish and Game recommended a revised minimum instream flow schedule (developed in October 2005) as a means to reduce summer water temperature in the Poe bypassed reach, and to benefit existing aquatic resources. This revised flow recommendation is supported by Butte County, Plumas County, the Water Board, and the NPS. The revised agency flow schedule ranges from 180 cfs in October, November, December, and January of critically dry water years to 500 cfs in May and June of wet water years (see table 9 in section V.C.1, *Water Resources*). This revised flow recommendation supercedes their initial flow recommendation. The Forest Service, however, has not modified its preliminary 4(e) condition for minimum flows. The Forest Service states that it will file final 4(e) conditions within 60 days of the issuance of the final EA (letter filed by J.S. Rider, Attorney for the Forest Service, San Francisco, CA, September 26, 2006, to M.R. Salas, Secretary, FERC, Washington, DC).

As we described in section V.C.1, we have also identified an intermediate flow regime that would improve conditions for existing fish species and increase aquatic habitat in the Poe bypassed reach. Similar to the flow schedules specified by the Forest Service and recommended by Interior and Cal Fish and Game, the staff-identified regime would vary on a monthly basis and by water year classification. The staff flow regime would range from 150 cfs in October, November, December, and January of critically dry water years to 300 cfs in May of wet water years (see table 9, in section V.C.1, *Water Resources*).

Our Analysis

In 2001, PG&E conducted an IFIM study, using a Physical Habitat Simulation (PHABSIM) model in conjunction with a habitat suitability criteria (HSC) study to determine the effects of different flow releases on the amount of suitable habitat for several species and life stages of fish in the Poe bypassed reach. These studies were scoped, designed, and conducted in consultation with the resource agencies to establish guidelines and to ensure effectiveness (TRPA, 2001). The PHABSIM modeling approach is a standard tool employed by water resource managers to evaluate relative changes in riverine habitat associated with variable flow conditions. The IFIM study for the Poe Project focused on fish species typical of the NFFR, including adult and juvenile

rainbow trout, Sacramento sucker, hardhead, Sacramento pikeminnow, and adult smallmouth bass. The PHABSIM model calculated weighted usable area (WUA), an index of habitat quantity, for each target species and life stage for flow increments that ranged from 40 to 1,250 cfs. Although there are other factors involved (e.g., water quality), the flow regime and associated physical habitat of a riverine system are critical factors in determining the productivity of fish populations (Milhous et al., 1989).

There are two main components of an IFIM study: (1) a field component that includes habitat mapping, measurements of hydraulic data at various study flows, and measurements of stream channel characteristics; and (2) a modeling component where the field data are overlaid with individual species habitat criteria for depth, velocity, and substrate. The product of an IFIM is an estimate of usable fish habitat over a range of simulated flows based on the habitat requirements of each individual species and life stage. Usable fish habitat at each flow is predicted by the PHABSIM model and given as WUA, which is expressed in square feet of usable habitat per thousand linear feet of stream.

Prior to implementation of the IFIM study, PG&E conducted a HSC study to develop site-specific habitat criteria curves for adult and juvenile life stages of rainbow trout, Sacramento sucker, Sacramento pikeminnow, hardhead, and smallmouth bass. To obtain habitat use data, divers were used to observe fish in the river and record habitat use across transects placed throughout the study reach. Field observations of water depth, velocity, and substrate were compared to fish density and utilization to determine habitat preferences for each species. This information was then used to construct habitat suitability indices (or curves), based on fish species density across representative transects.

Because the applicant's PHABSIM model did not specifically estimate WUA for the existing minimum flow (50 cfs) or for its proposed minimum flow (150 cfs), we estimated these values by interpolating between adjacent WUA values used in the model (40 and 60 cfs; 140 and 160 cfs). Similarly, we also interpolated WUA values for several of the flows from the resource agencies' and the staff's identified flow schedule that were not specifically modeled (e.g., 280 cfs). We calculated the relative change in habitat availability by comparing the percentage of WUA available at 50 cfs (baseline conditions) and 110 cfs (existing conditions with leakage) to the 150 cfs PG&E proposed flow and the variable flow schedules specified or recommended by the agencies and identified by staff. The instream flow alternatives were also evaluated by comparing the percent of maximum habitat (WUA) available under each of the flow schedules. Appendix B compares the percent of maximum WUA available for the alternative flow schedules for selected species and life stages.

The existing 50 cfs minimum flow requirement provides approximately 45 percent of maximum available habitat for juvenile rainbow trout and 29 percent of maximum available habitat for adult rainbow trout (appendix B). Leakage flow from the Poe dam

radial gates increases the total minimum flow from the dam to approximately 110 cfs, and has increased the amount of suitable habitat for the majority of the species in the bypassed reach. This leakage flow provides approximately 58 percent of the maximum available habitat for juvenile rainbow trout and 44 percent of maximum available habitat for adult rainbow trout (appendix B). The existing 110 cfs flow has increased available suitable habitat by as much as 40 percent for juvenile rainbow trout and 67 percent for adult trout (table 21). Total wetted area has increased by approximately 9 percent as a result of leakage at the dam (table 21).

The IFIM study results indicate that the flow schedules proposed by PG&E, specified or recommended by the resource agencies, and identified by staff would increase the amount of suitable habitat for six of the eight species and life stages evaluated in all water year types, relative to the required minimum flow and to existing conditions with leakage (table 21). Habitat availability for juvenile Sacramento sucker, however, would likely be reduced. Habitat for adult hardhead would remain largely unaffected or would be reduced, depending on water year type and the month in which the release is made (table 21).

The 150 cfs minimum instream flow proposed by PG&E would increase the amount of suitable habitat for juvenile rainbow trout by approximately 58 percent and increase suitable habitat for adult rainbow trout by as much as 106 percent as compared to the conditions required by the existing license (table 21). Total wetted area would likely increase by 13 percent. A marginal increase of 1 percent would be expected for adult hardhead because the most suitable habitat for this life stage is in areas with velocities of less than 0.5 foot per second. The flow schedule proposed by PG&E would likely decrease the amount of suitable habitat for juvenile Sacramento sucker by approximately 18 percent because the most suitable habitat for this life stage is low-velocity water (less than 0.25 foot per second). During lower flow summer months (June through September), PG&E's proposed flow of 150 cfs would provide approximately 71 percent of the maximum available habitat for juvenile rainbow trout and 59 percent for adult rainbow trout during all water year types (appendix B).

The staff-identified flow schedule would also increase the amount of suitable habitat for the same six species and life stages as compared to baseline (50 cfs) and existing conditions (110 cfs), but to a greater extent than that proposed by PG&E. Increases in suitable habitat for juvenile rainbow trout would range from 58 percent in dry and critically dry water years to 98 percent in wet water years as compared to baseline conditions (table 21). During lower-flow summer months (June – September), the staff-identified flow schedule would provide approximately 74 to 84 percent of the maximum available habitat for juvenile rainbow trout depending on water year type (appendix B). For adult rainbow trout, increases in suitable habitat would range from 106 percent in dry and critically dry water years to 230 percent in wet water years as compared to baseline conditions (table 21). During lower-flow summer months (June –

September), the staff-identified flows would provide approximately 63 to 81 percent of the maximum available habitat for adult rainbow trout (appendix B). The staff-identified flow schedule would also increase the amount of available habitat for native minnow species, although habitat for adult hardhead would increase only minimally, and may be reduced during some months as compared to baseline conditions. Increases in total wetted area would range from 13 to 24 percent as compared to baseline conditions depending on water year type (table 21). A reduction in suitable habitat is likely for juvenile Sacramento sucker at higher flows because juveniles of this species are better adapted for low velocity water.

The flow schedule specified by the Forest Service (condition 24[1]) would also increase the amount of suitable habitat available for the same six species and life stages as compared to baseline (50 cfs) and existing conditions (110 cfs) (table 21). Increases in the amount of suitable habitat available for juvenile rainbow trout would range from 58 percent in critically dry water years to 101 percent in wet water years (table 21). During lower-flow summer months (June – September), the Forest Service’s flow schedule would provide approximately 76 to 89 percent of the maximum available habitat for juvenile rainbow trout depending on water year type and month (appendix B). For adult rainbow trout, increases in the amount of suitable habitat would range from 106 percent in critically dry water years to 239 percent in wet water years as compared to baseline conditions. During lower-flow summer months (June – September), the Forest Service’s flow schedule would provide approximately 67 to 94 percent of the maximum available habitat for adult rainbow trout depending on water year type and month (appendix B). The Forest Service’s flow schedule would also increase the amount of available habitat for native minnow species, although habitat for adult hardhead would increase only minimally, and may be reduced during some months as compared to baseline conditions. Increases in total wetted area would likely range from 13 percent to 31 percent depending on water year type as compared to baseline conditions (table 21).

The revised flow schedule recommended by Cal Fish and Game and Interior would increase the amount of suitable habitat for the same six species and life stages, compared to baseline and existing conditions (table 21). Increases in the amount of suitable habitat for juvenile rainbow trout would range from 69 percent in dry and critically dry water years to 105 percent in wet water years (table 21). During lower-flow summer months (June – September), the revised resource agency flow schedule would provide approximately 76 to 93 percent of the maximum available habitat for juvenile rainbow trout depending on water year type and the month (appendix B). For adult rainbow trout, increases in the amount of suitable habitat would range from 133 percent in dry and critically dry water years to 245 percent in wet water years as compared to baseline conditions (50 cfs). During lower-flow summer months (June – September), the revised resource agency flow schedule would provide approximately 67 to 100 percent of the maximum available habitat for adult rainbow trout depending on water year type and the month (appendix B). The revised resource agency flow schedule would also increase

the amount of available habitat for native minnow species, although habitat for adult hardhead would increase only minimally, and would likely be reduced during some months as compared to baseline conditions. Increases in total wetted area would likely range from 16 to 34 percent, depending on water year type and month, as compared to baseline conditions (table 21).

As stated above, a reduction in the amount of suitable habitat is likely for juvenile Sacramento sucker as a result of all flow schedules, because juveniles of this species are generally associated with lower velocity water. A substantial percentage of the juvenile Sacramento sucker observed during PG&E's relicensing studies were in areas where water velocity was close to zero. The amount of suitable habitat available for adult hardhead could be reduced in May of wet years by as much as 9 percent as a result of the staff-identified flow schedule and 16 percent as a result of the revised resource agency flow schedule because the higher flows would increase water velocity.

Because the flow regime is an integral part of a river system that affects the overall productivity of its fishery (Milhous et al., 1989), increased minimum instream flow releases would likely benefit fish and aquatic resources in the Poe bypassed reach. Increased flow in the bypassed reach in recent years as a result of leakage from the radial gates at the Poe dam has already (at least temporarily) resulted in an increase in the amount of suitable habitat available to riverine fishes (PG&E, 2003) and, consequently, it is likely that bypassed reach fisheries and aquatic resources have been positively affected. The flow schedules proposed by PG&E, specified by the Forest Service, recommended by Interior and Cal Fish and Game, and the staff-identified flow schedule would all increase the amount of suitable habitat and improve ambient conditions (e.g., water velocity) for juvenile and adult rainbow trout, juvenile hardhead and juvenile Sacramento pikeminnow, and adult Sacramento sucker. The flow schedules specified by the Forest Service, recommended by the resource agencies, and identified by the staff would provide greater increases in suitable habitat for six of the eight species and life stages inhabiting the Poe bypassed reach than the flows proposed by PG&E, although substantial gains would be reached through the implementation of their proposed continuous release of 150 cfs.

In addition to providing suitable habitat and increasing habitat availability, increased minimum flows would likely enhance conditions for aquatic biota in the Poe bypassed reach by providing greater opportunities for spawning, decreasing inter- and intra-specific competition, and by improving small-scale geomorphic and sediment transport processes. The variable nature of the agencies' and staff-identified flow schedules would provide a more dynamic flow regime that better reflects the unimpaired hydrograph for this region. By better mimicking the natural hydrograph, a variable flow regime would also provide important environmental cues that serve as triggers for certain behaviors (e.g., spawning and migration).

Table 21. Predicted percent change in WUA (square feet/1,000 river feet), compared to baseline conditions (50 cfs), as a result of PG&E, resource agencies', and staff-identified flow schedules for the Poe bypassed reach, NFFR, CA.^a
(Source: PG&E, 2003, as modified by staff)

Target Species	Existing (110 cfs - with leakage)	PG&E Proposal (150 cfs)	Staff- Identified Flows (150 to 300 cfs)^b	Forest Service Flows (150 to 425 cfs)^b	Revised Agency Flows (180 to 500 cfs)^b
Rainbow trout (juvenile)	40%	58%	58 to 98%	58 to 101%	69 to 105%
Rainbow trout (adult)	67%	106%	106 to 230%	106 to 239%	133 to 245%
Sacramento sucker (juvenile)	-14%	-18%	-18 to -33%	-18 to - 31%	-21 to - 28%
Sacramento sucker (adult)	24%	34%	34 to 57%	34 to 62%	39 to 68%
Hardhead and Sacramento PKM (juvenile)	24%	36%	36 to 81%	36 to 86%	45 to 92%
Sacramento PKM (adult)	14%	18%	17 to 21%	14 to 18%	9 to 20%
Hardhead (adult)	1%	1%	-9 to 1%	-12 to 1%	-16 to 1%
Smallmouth bass (adult)	12%	16%	13 to 18%	10 to 16%	6 to 17%
Total Wetted Area	9%	13%	13 to 24%	13 to 31%	16 to 34%

^a The percent increase in the amount of suitable habitat available with leakage flow is also provided

^b Varies by season and by water year type.

Water Temperature

Based on the life history and water temperature preference information reported for resident fish species in the Poe bypassed reach, existing summer water temperatures in the bypassed reach may favor native minnows and suckers (e.g., Sacramento sucker, hardhead, and Sacramento pikeminnow) (Moyle, 2002). However, management of the NFFR as a coldwater trout fishery is a stated objective of the resource agencies (TRPA,

2001). Additionally, the Water Quality Control Plan (Basin Plan) for the Sacramento River basin defines cold freshwater as an existing beneficial use of the Feather River. The minimum instream flows proposed by PG&E, recommended or specified by the resource agencies, and identified by staff would all have the potential to decrease water temperatures in the Poe bypassed reach, which would likely improve conditions for coldwater fish species. However, decreased water temperatures may adversely affect native and nongame fishes (e.g., hardhead), if it falls below an individual species' optimum temperature range.

Our Analysis

In section V.C.1, *Water Resources*, we present our analysis of expected water temperature changes resulting from PG&E's proposed 150 cfs flow release, the flow schedule specified by the Forest Service (condition 24[1]), the revised flow recommendation recommended by Interior and Cal Fish and Game, and the staff-identified variable flow regime. Our analysis here focuses on the effects of these predicted water temperature changes on the fishery resource in the Poe bypassed reach. The discussion below considers the effects of the likely temperature changes for the bypassed reach that would take place in the vicinity of the Poe powerhouse.

In 1999 and 2000, PG&E modeled stream temperatures in the bypassed reach using a SNTMP model to assess changes in water temperature resulting from releases from the Poe dam. Modeling was conducted for flows that ranged from 50 to 1,250 cfs in the summer months (June – September) under hydrologic and meteorological conditions considered normal and extreme. The model predicts a reduction in water temperature ranging from 0.5 to 1.3°C for PG&E's proposed flow of 150 cfs, 0.6 to 1.6°C for the staff-identified flows, 0.6 to 1.9°C for the Forest Service flow schedule, and 0.7 to 2.0°C for the agency-revised flow schedule as compared to baseline conditions (50 cfs) in normal water years. Similar reductions are expected in extreme water years (see table 10).

Water temperatures that may result from the instream flows proposed by PG&E, specified by the Forest Service (condition 24[1]), recommended by Interior and Cal Fish and Game, and identified by Commission staff would improve conditions for the coldwater fishery by providing water temperatures within or closer to (in some months) the optimal temperature requirements for rainbow trout. The flow regime specified by the Forest Service and the revised agency-recommended flows would provide the greatest reduction in temperatures (up to 2.1°C in extreme water years); however, the PG&E proposed and staff-identified flows would also reduce water temperature by as much as 1.4 and 1.7°C. These results are based on water temperature modeling from immediately upstream of the Poe powerhouse. Water temperatures farther upstream may be lower than those predicted by the model, because the canyon-like topography of the upper bypassed reach maintains colder temperatures. Because rainbow trout prefer ambient water temperatures between 15 and 18°C (Moyle, 2002), a reduction of mean daily

summer water temperature to a range closer to the preferred temperatures may benefit trout by enhancing metabolic function (e.g., respiration and growth rates) and improve over-summer survival and recruitment. Therefore, reduced water temperatures in the bypassed reach could assist the resource agencies in meeting their goal of managing the NFFR as a coldwater fishery.

Alternatively, cooler water temperatures may adversely affect hardhead and pikeminnow because ambient temperatures would likely be below their preferred temperature range of 24 to 28°C (Moyle, 2002). Sacramento suckers, however, have a wider tolerance for temperature fluctuations (Moyle, 2002), so decreasing mean daily water temperature to less than or equal to 20°C would likely not have an adverse effect on populations within the Poe bypassed reach. Non-native game fish (such as smallmouth bass) could also be affected by colder temperatures through the alteration of growth and metabolic rates, as well as from disruption in spawning behavior, which could lead to diminished recruitment.

Water Temperature Management

The initial agency recommended flow schedule and the Forest Service's specified flow schedule contained a recommended measure for PG&E to release WTM flows and develop a Water Temperature Maintenance, Moderation, and Monitoring plan. The plan would outline measures to maintain a mean daily water temperature of less than or equal to 20°C. If between the period of June 1 to September 15, mean hourly temperature measured at the downstream end of the bypassed reach exceeds 20°C, and is more than 1.0°C warmer than the water temperature immediately below Poe dam, the agencies recommended that PG&E incrementally increase minimum flow releases by 25 cfs per day to achieve a maximum water temperature difference between upstream and downstream monitoring stations of 1°C. Our analysis of the effects of WTM flows on water temperature is previously discussed in section V.C.1, *Water Resources*. Although the resource agencies did not include WTM flows in their revised flow recommendation, the Forest Service still recommends these flows as a 10(a) measure.

PG&E did not propose WTM flows or monitoring plans to address water temperature in the bypassed reach. However, as described above, PG&E's proposed minimum instream flow of 150 cfs would reduce water temperature in the Poe bypassed reach, which would make the reach more suitable for coldwater species.

Our Analysis

Based on the water temperature information gathered during 1999, 2000, and 2003 (June through September) by PG&E, it is evident that water entering and within the bypassed reach frequently exceeds 20°C (see table 8). A maximum mean daily water temperature of 24.5°C occurred in July of 2003, while the minimum mean daily

temperature for the 3-year study period was 12.9°C in June of 1999. Cold water inflow from Poe reservoir, Mill Creek, and Flea Valley Creek combined with the canyon-like topography and riparian shading, likely reduce the potential for extremely high water temperatures in the upper part of the bypassed reach. Water temperatures exceeded 20°C approximately 20 to 28 percent of the days monitored at stations near Pulga and below the Poe dam (table 8). Further downstream, near Bardee's Bar and the Poe powerhouse, temperatures exceeded 20°C more frequently, from 39 to 68 percent of the days sampled (table 8). Water temperatures of about 23 to 25°C (maximum observed 24.5°C), which were often observed near Bardee's Bar and upstream of the powerhouse, particularly in 2003, are near the lethal tolerance limit for rainbow trout, although this maximum limit varies by age class and acclimatization time (Moyle, 2002).

As we described above and in section V.C.1, *Water Resources*, PG&E modeled stream temperatures in the Poe bypassed reach using a SNTMP model to assess changes in water temperature resulting from different flow releases from Poe dam. The results of the SNTMP modeling indicate that the greatest decreases in water temperature would occur at flows of 300 cfs or less in years with normal or extreme climatic conditions. The SNTMP model indicates that the initial agency/Forest Service's recommended WTM flows would only result in additional decreases in mean daily water temperature ranging from 0.2°C in August of normal water years to 0.6°C in July of critically dry water years, compared to the recommended/specified minimum flow schedule. Compared to staff-identified minimum flows, WTM flows would reduce water temperatures by an additional 0.4°C in August of both normal and critically dry water years and up to 0.9°C in July of critically dry years (see table 13). Therefore, the additional temperature reduction benefits of WTM flows to fishery resources would likely provide minimal benefits to the aquatic resources in the Poe bypassed reach.

Pulse Flows

The Forest Service specified and the resource agencies' recommended that PG&E implement pulse flows in the Poe bypassed reach to flush fines from spawning gravels, transport organic materials, and move sediment. The Forest Service specified and the resource agencies recommended that if, by February 10 of dry and critically dry water years, a natural or operational-related mean daily flow of 2,000 cfs has not occurred in the preceding 18 months, PG&E would implement a single 2,000-cfs pulse flow by March 1. The duration of the pulse flow recommended by Interior and specified by the Forest Service would be 12-hours excluding up- and down-ramping, while Cal Fish and Game recommends a 2,000 cfs pulse flow of 72 hours, including up- and down-ramping. To protect rainbow trout that may have begun spawning, the pulse flow release would not occur if water temperatures have exceeded 10°C on two successive days, or if rainbow trout spawning has been observed by Cal Fish and Game or other entities. The total volume of water released would not exceed 2,560 acre-feet. Ramping rates associated

with these releases would follow the proposed project ramping rates previously discussed in section V.C.1, *Water Resources*.

The Forest Service, in final 4(e) condition no. 24 (2)(B), specified that PG&E develop and implement a pulse flow monitoring plan to evaluate whether pulse flows are effective at redistributing fine-grained sediment and organic debris.

PG&E did not propose pulse flows in the license application. In its May 23, 2005, response to the agencies' comments, terms, and conditions for the Poe Project, PG&E noted that rainbow trout spawning has occasionally been observed in early March and when water temperature is below 10°C, and suggests that the window for a pulse flow release of 2,000 cfs be moved to February 15, as opposed to March 1, to ensure protection of rainbow trout spawning.

Our Analysis

Flushing flows (pulse flows) are a standard management tool to remove accumulated sediments and organic debris for the improvement of spawning habitat in regulated river systems used. Optimal conditions for spawning rainbow trout typically consist of gravels that range from 15 to 100 mm in diameter (depending on the size of fish at spawning) with less than 5 percent fine-grained materials (Raleigh et al., 1984).

The variable nature of the precipitation regime in northern California results in regular occurrences of dry and critically dry water years, which can reduce the frequency of high flows. Although flows in excess of 2,000 cfs are typical for the Poe bypassed reach (table 22: 20 of the 24 water years examined in the table have flows in excess of 2,000 cfs), there have been water years where a flow of this magnitude has not occurred. These low-flow periods have extended for 18 consecutive months (USGS, 2005b). Mean monthly flows in the bypassed reach during Poe Project operations (for the period 1968 to 2003) are 1,497 cfs in February and 1,899 cfs in March (see table 4). A periodic pulse flow of 2,000 cfs would not be substantially different from baseline conditions, and would be typical of the Sierra Nevada hydrograph to which the aquatic biota in the bypassed reach is adapted.

Several methods can be used to determine the magnitude of appropriate flushing flows. Annear et al. (2002) summarized several of the current techniques used to establish pulse flow recommendations for regulated rivers (table 23). The methods presented by Annear indicate that local hydrologic and sediment transport processes should be considered before a recommendation is made. Annear et al. also highlight the fact that pulse flows could adversely affect riverine reaches where the need for such a release has yet to be determined, especially in sediment-starved systems or where the riparian corridor is not stabilized.

Table 22. Number of days that daily average flow exceeded 1,000 cfs thresholds in the Poe bypassed reach, as measured at the Pulga gage, NFFR, CA, 1980 to 2003 water years. (Source: USGS, 2005b)

Year	Flow (cfs)									
	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000+
2003	42	18	12	8	6	6	5	2	2	2
2002	9	4	2	2	0					
2001	0									
2000	25	10	7	6	6	4	4	4	3	2
1999	140	105	48	27	14	8	6	5	2	2
1998	167	143	106	83	62	31	15	8	6	4
1997	102	74	53	39	31	28	23	19	16	15
1996	117	85	61	35	20	17	11	9	9	9
1995	139	135	121	102	87	62	43	39	36	30
1994	0									
1993	72	43	35	23	17	13	9	9	8	5
1992	1	1	0							
1991	4	2	2	2	2	2	1	1	1	1
1990	1	0								
1989	22	13	10	10	9	7	5	5	4	3
1988	1	1	0							
1987	6	3	2	2	2	0				
1986	74	50	33	27	25	21	20	19	18	15
1985	1	0								
1984	72	45	33	24	18	14	11	8	5	3
1983	152	143	137	120	92	58	43	28	23	11
1982	121	98	83	69	55	43	31	25	19	17
1981	4	2	1	0						
1980	31	22	16	14	14	14	12	11	9	9
Totals by flow % of days	1303	997	762	593	460	328	239	192	161	128
	14.9	11.4	8.7	6.8	5.3	3.7	2.7	2.2	1.8	1.5

Site-specific information on the movement of substrates in the Poe bypassed reach is limited to the sediment incipient motion analysis conducted by PG&E and submitted as part of the license application. The analysis indicates that particles up to 7 millimeters in diameter would be moved at flows of 100 cfs or less. A pulse flow of 2,000 cfs, as specified by the Forest Service and recommended by Butte County, Interior, and Cal Fish and Game, would result in the mobilization of substrates up to approximately 30 mm, or coarse gravel, which would maintain the condition of spawning gravels in the reach during low flow periods. Although flows of 100 cfs would be sufficient to entrain fine-

Table 23. Description of methods used for developing pulse flow releases in regulated river systems. (Source: Annear et al., 2002)

Method	Magnitude	Duration	Poe Reach 1958 - 1998, during Project operation^a	Poe Reach (1911 - 1958, Pre-Project operation^a)
Tennant	200 percent of Mean Annual Flow	48 to 72 hours	1,600 cfs ^b	5600 cfs ^c
Hoppe	17th percentile of annual flow duration curve	48 hours	300 cfs	4500 cfs
Beschta & Jackson	5th percentile of annual flow duration curve	None given	4500 cfs	7500 cfs

^a As measured at the Pulga gage.

^b Mean annual flow is calculated as 803 cfs (see table 4).

^c Mean annual flow from the period 1912 - 1958 was approximately 2800 cfs (USGS, 2006a).

grained sediment, a larger pulse flow would allow more of the streambed to be submersed, consequently allowing a greater surface area of stream gravels to be washed free of accumulated debris and sediment.

Although the magnitude of a pulse flow is a critical factor related to its success, the duration of a pulse flow is equally important. The sediment incipient motion analysis conducted by PG&E did not include an assessment of effective pulse flow duration. Total duration of the pulse flow (including ramping) recommended by Interior and specified by the Forest Service would be 29.5 hours as compared to the 72 hours recommended by Cal Fish and Game. The pulse flows recommended by Interior and Cal Fish and Game, and specified by the Forest Service, would follow the proposed ramping rates previously discussed in section V.C.1, *Water Resources* (400 cfs up-ramp and 150 cfs down-ramp for January and February).

Pulse flows could disrupt rainbow trout spawning, if a release was made during or after spawning. High pulse flows have the potential to affect adult behavior, displace eggs, or dislodge gravel in established redds. PG&E's proposal to adjust the pulse flow schedule so that releases are made before February 15 would likely ensure that rainbow trout spawning is not adversely affected. Rainbow trout are known to spawn as early as February in California rivers (Moyle, 2002). Because the releases would occur by February 15th when flows are typically highest, effects on aquatic fauna would be limited.

Recreational Boating Flow Releases

American Whitewater, Chico Paddleheads, and Shasta Paddlers (hereinafter referred to as the Boating Groups) recommended several conditions for inclusion in any new license issued for the Poe Project (letter from D. Steindorf, California Stewardship Director, American Whitewater Affiliation, Paradise, CA, to M.R. Salas, Secretary, FERC, Washington, DC, April 11, 2005). These include (1) the implementation of a summer recreational release schedule consisting of one boating release per weekend from June to October in all water years, and (2) adjusting down-ramping rates to 20 percent per day during spring spills upon PG&E's achievement of control of water at the project.

The Boating Groups recommend that when Lake Oroville is above elevation 800 feet above mean sea level (msl), the boating flow release would be not less than 800 cfs and not more than 1,300 cfs. In any given year, 50 percent of those flows would be between 1,000 and 1,200 cfs, as measured at the Pulga gage. PG&E would provide the recommended flow releases between 9:00 a.m. and 6:00 p.m. On release days when Lake Oroville is at or below elevation 800 feet msl, the recreational flow release would be not less than 1,500 cfs and not more than 2,500 cfs. In any given year, 50 percent of these releases would be above 1,750 cfs. Under this scenario, the flow release should be provided from 10:00 a.m. and 6:00 p.m. at Bardee's Bar.

Alternatively, the Anglers Committee, a group of sport fishers based in northern California, presented arguments against the implementation of short-term whitewater releases or whitewater test flows in the Poe bypassed reach, until scientific data illustrate that recreational boating releases do not adversely affect fish, macroinvertebrates, or amphibians (letter from R. Baiocchi, Chairman, Anglers Committee, Blairsden, CA, to M.R. Salas, Secretary, FERC, Washington, DC, February 24, 2004).

PG&E, in its reply comments, indicated that it is not proposing any recreational flow releases, pending the results of studies conducted on the effects of whitewater boating flows on FYLF at the upstream Rock Creek-Cresta Project. The applicant also indicated that recreation flows should not occur from mid-April to late-August, to protect FYLF egg masses and small tadpoles. This topic is covered in more detail in section V.C.3., *Terrestrial Resources*.

Median monthly flows in the bypassed reach, as recorded at the Pulga gage from 1968 to 2003 (table 4), are 62 cfs (June), 60 cfs (July), 60 cfs (August), and 61 cfs (September). Only on rare occasions since the beginning of Poe Project operation has flow exceeded 150 cfs in the bypassed reach during the summer months, although much higher flows occurred during the summer months prior to the construction of the hydroelectric projects on the NFFR (USGS, 2005b). The release of recreational boating flows ranging from 800 to 2,500 cfs is well outside the typical summer flows for the reach under baseline conditions (current project operations). Flows of this magnitude have the potential to adversely affect aquatic biota in the bypassed reach.

Our Analysis

Fisheries

To assess the potential effects of boating flows, we reviewed the results of monitoring studies conducted for recreational flow releases at the Rock Creek-Cresta Project, which is located just upstream of the Poe Project. The Cresta powerhouse discharges into the NFFR just above the upstream end of Poe reservoir. The Rock Creek-Cresta Project license required annual monitoring at several stations in the Rock Creek and Cresta bypassed reaches to assess the effects of recreational flow releases on macroinvertebrates, fish, and amphibians. The downstream end of the Cresta bypassed reach is just above Poe reservoir, while the downstream end of the Rock Creek bypassed reach is approximately 9 river miles upstream of Poe reservoir. The aquatic biota in the Rock Creek reach is similar to that in the Poe bypassed reach, and thus conclusions regarding the effects of flow releases in the Rock Creek reach may be used as a general indicator of the potential effects of recreational flow releases in the Poe bypassed reach. Although recreational flow releases in the Rock Creek reach (800 to 1,600 cfs) are slightly lower than those proposed for the Poe reach (800 to 2,500 cfs), we expect the same general biological responses to occur.

PG&E conducted fish stranding studies in 2002, 2003, and 2004 in the Rock Creek and Cresta bypassed reaches. The results of PG&E's monitoring indicated that juvenile fish are only marginally affected and that only limited off-channel stranding occurred as a result of recreational boating releases. In 2002, 224 fish were found stranded, of which approximately 210 were post-larval minnow or sucker fry (ERC, 2003). In 2003, 156 stranded fish were observed, of which greater than 76 percent were post-larval minnow or sucker fry (ERC, 2004). Rainbow trout were not found stranded during whitewater releases. The majority of stranding (for minnow and sucker fry) occurred during the June and July releases of both years (96 percent). After July, it is likely that young-of-the-year fish have reached a size that would allow them to avoid being stranded.

From 2002 to 2004, PG&E conducted fish displacement surveys at four stations in both the Rock Creek and Cresta bypassed reaches through direct observation of fry and juvenile fish in shallow, slow, near-shore environments. Monitoring took place before and within 24 hours of each scheduled flow release from June through September. The data collected by PG&E indicated that:

- Rainbow trout fry were approximately 40 to 50 mm long at the onset of the first flow releases in June, indicating that they were of a size large enough to avoid displacement.
- The same general number of fish was present before and after the each release, suggesting that local populations are tolerant to short-term, high-flow events.

- Smallmouth bass fry were also large enough to avoid being displaced by flows of the magnitude released during recreational flow testing.
- Juvenile minnows and suckers moved laterally towards shore during the onset of recreational releases, indicating that the young-of-the-year of these species are able to seek out velocity shelters to avoid high-water releases (ERC, 2005).

The results of the studies conducted upstream at the Rock Creek-Cresta Project indicate that recreational flow releases have little effect on fishery resources. It is expected that the same type of response would occur in the Poe bypassed reach if the recreational flow releases recommended by the Boating Groups were implemented. Additionally, fish in the Poe bypassed reach typically spawn in the early to late-spring (Moyle, 2002); therefore, the Boating Groups' recommended recreational flow releases (June through September) are unlikely to disrupt fish spawning. Displacement studies suggest that the same general number of juvenile fish is present before and after flow releases, although the ability of the sampling methodology employed by PG&E to detect differences (i.e., the statistical power) is not known. It is also possible that fish displaced by recreational flows, are simultaneously replaced by fish entrained from upstream. Final reports from studies conducted as part of the Rock Creek-Cresta Project are anticipated in 2007 but were not available prior to the completion of this final EA.

Macroinvertebrates

PG&E conducted three seasons of macroinvertebrate sampling (June to October, 2002-2004) in the Rock Creek bypassed reach. PG&E collected drift macroinvertebrate samples for fifteen minutes every two hours from 12:00 p.m. on the Thursday preceding recreational flow releases to 12:00 p.m. on the Tuesday following releases, to gather information prior to, during, and after the release of weekend boating flows. Subsequently, PG&E, in consultation with the Ecological Resources Committee (ERC), a group of stakeholders involved with study planning and review for the Rock Creek-Cresta Project, determined that drifting organisms provided only an indirect indication of the effects of recreational flow releases on the overall macroinvertebrate community. In 2003 and 2004, PG&E shifted sampling methods from evaluating the response of drifting organisms to evaluating the response of substrate and benthic organisms.

The 2002 drift sampling indicated that:

- Increases in drifting macroinvertebrates were widespread in response to high-flow events.
- Behavioral patterns of drifting organisms were interrupted by recreational flow releases.

- Pronounced seasonal differences were observed in the abundance of drifting organisms.
- Taxa that would not be expected to drift under normal conditions (e.g., heavy organisms such as large snails and clams) were collected during high-flow events.
- The number of drifting organisms (increases in drift during high-flows) was statistically significant in every month sampled.

The 2003 and 2004 substrate and benthic sampling indicated that:

- Species richness, diversity, and abundance were negatively affected over time (June – October), although more so in 2003 than in 2004.
- In 2004, pre- versus post-comparisons of species richness, diversity, and abundance measures indicated that an initial rearrangement of the benthos occurs immediately following high-flow events, but that very similar or slightly higher values in the post-flow indices were observed for each month. None of these pre-versus post-flow differences were statistically significant.
- Pre- versus post-comparisons indicate that an initial rearrangement of the benthic invertebrate community occurs, which is followed by a general decline in abundance. Eventually, the benthic community re-establishes itself, but to a degraded state.
- Statistically significant differences in the distribution of functional feeding groups (e.g., scrapers and shredders) occur as a result of high-flow events.
- Benthic organisms are often displaced from their preferred velocity range.
- Changes in the abundance of worms and clams suggests that flows were sufficient to mobilize bedload sediment and associated biota.
- Based on Indices of Similarity, pre- and post-macroinvertebrate abundance does not quantitatively change as a result of flow releases; however, changes in species composition do occur.
- One-month post-flow data indicate that the benthic community re-equilibrates.
- A consistent decline in overall benthic community measures (e.g., abundance and species diversity) occurs over time (June through October), although not significant.

Based on the results of the studies implemented at the Rock Creek-Cresta Project, it appears that both drifting and benthic macroinvertebrates are affected to some degree by recreational boating releases. The reliability of data associated with drifting macroinvertebrates is only an indirect measure of the potential effects of high-flow summer releases as these organisms are likely to move regardless of project operations. These effects, however, do not appear to result in significant changes in overall abundance or species diversity. The data also indicate that the benthic community is able to reestablish itself over time after implementation of high-flow releases.

We discuss the effects of recreational flow releases on amphibian species in greater detail in section V.C.3, *Terrestrial Resources*.

Ecological Monitoring of the Poe Bypassed Reach

The resource agencies have advanced several measures to assess the condition of the aquatic biota in the Poe bypassed reach after the implementation of license conditions. Letters filed by the respective agencies contain the details of all specified monitoring for the Poe bypassed reach. A brief synopsis of these measures is as follows:

- Instream Flow Effects Monitoring (Interior 10(j) recommendation no. 1C) – In consultation with the resource agencies, develop a monitoring plan to assess the effects of recommended minimum instream flows on fish and aquatic resources.
- Pulse Flow Effects Monitoring (Interior 10(j) recommendation no. 1C and Forest Service final 4(e) condition no. 2B) – In consultation with the resource agencies, develop a monitoring plan to evaluate movement of organic and fine-grained materials from spawning-sized stream substrate, as well as the effectiveness of the removal of organic materials (fines) that have accumulated in the Poe reach since the last spill-flow of 2,000 cfs.
- Poe Reach Biological Monitoring (Interior 10(j) recommendation no. 7) - File with the Commission a fish population, amphibian, and macroinvertebrate monitoring plan to be implemented within 2 years of license issuance. PG&E would conduct biological monitoring studies every 2 years over the term of the license, starting in the second year of the license.
- Poe Reach Biological Monitoring for Fish and Benthic Macroinvertebrates (Forest Service final 4(e) condition no. 28) – Conduct biological monitoring in the Poe bypassed reach every 2 years over a 6 year period beginning in years 6 and 16 after license issuance, for a total of six sampling efforts over the two periods.
- Fish Population Monitoring (Interior 10(j) recommendation no. 7a) - Implement biennial fish population studies over the term of the new license using standard fish sampling methods including snorkel/scuba, backpack/boat electrofishing, and

angler surveys for the full length of the trout season in project waters. The studies would include discrete criteria to assess wild trout age class, average size (length and weight), available size (length), total biomass (pounds/acre), harvestable component, and angler catch rate (including catch and release).

- Rainbow Trout Access to Project Tributaries (Interior 10(j) recommendation no. 7b and Forest Service final 4(e) condition no. 24(6)) - Design and implement a study to evaluate accessibility for spawning adult and outmigrating juvenile rainbow trout in Flea Valley Creek and Mill Creek during the spawning season and during low-flow summer months. The study would also identify means by which access to tributaries can be improved for rainbow trout.
- Macroinvertebrate Monitoring (Interior 10(j) recommendation no. 7d) - Implement biennial macroinvertebrate monitoring studies over the term of the license that utilize a scientifically accepted bioassessment procedure. The studies would include objectives to assess possible relationships between the macroinvertebrate assemblage, biomass, and watershed management actions, including changes to instream flow and temperature. To accomplish the plan's objectives, the studies would include the development of performance criteria including biodiversity and total biomass. Macroinvertebrate surveys would be conducted during late summer/fall and be coordinated with the fish and amphibian monitoring studies.
- Evaluation of Biological Monitoring (Interior 10(j) recommendation no. 7e) – Review and evaluate data from instream flow and biological monitoring plans described above in consultation with the resource agencies to assess the effects of project operations on fish and wildlife resources. If, after review of the collected data, the resource agencies determine that aquatic species or other ecological attributes would benefit from modifications to the recommended minimum instream flows, PG&E and the resource agencies would evaluate and determine whether such instream flow modifications (1) can be implemented within the PG&E's operational capabilities; (2) would maintain the total annual volume of water that has been allocated for minimum instream flows in any given water year type; and (3) would not adversely effect beneficial uses. If all of the resource agencies agree and propose a Revised Minimum Instream Flows Schedule that meets these criteria, then PG&E would file the revised schedule with the Commission for approval.

Cal Fish and Game did not provide a specific recommendation for monitoring frequency in its preliminary 10(j) recommendations for the Poe Project; however, in their comments on the draft EA, they recommended back to back annual monitoring every 5 years, after the issuance of any new license for the project.

PG&E did not propose any long-term monitoring of aquatic resources. In its reply comments to the resource agencies' preliminary and final terms and conditions, PG&E

did not express agreement or disagreement with the monitoring plans, but stated that they should have specific objectives with detailed measurement criteria and decision points prior to acceptance of any post-licensing plans.

Our Analysis

Periodic monitoring would allow PG&E, the resource agencies, and the Commission to assess how fish and aquatic resources in the project area are affected by the conditions included in any license that may be issued. In addition, the adaptive nature of the monitoring programs as specified by the Forest Service, and recommended by Interior and Cal Fish and Game, allow refinements to be developed for instream and pulse flows, if it is determined after review of the monitoring data that modifications are necessary. These monitoring programs would provide important information on the response of fish and wildlife resources, and associated habitats, to any conditions implemented. There may be some minor effects on aquatic resources associated with the monitoring programs (e.g., injuries to fish as a result of electrofishing), but this would not affect fish on a population-level.

With regard to rainbow trout access to tributaries, PG&E's license application included results of a fish barrier survey conducted in 1999 that identified the location, physical dimensions (height and width), and type of barrier present in Flea Valley Creek and Mill Creek. PG&E also observed the status of each barrier during low-flow conditions (September and October) to determine whether upstream passage was fully blocked, partially blocked, or passable.

In Flea Valley Creek, PG&E reports that there are eight partial barriers to fish migration during low-flow conditions in the first river mile. Seven of these barriers are approximately 2-3 feet in total height and result from the accumulation of woody debris and boulders. Because of their small size, they are passable during fall, winter, and spring hydrologic conditions and do not affect adult rainbow trout utilizing Flea Valley Creek for spawning. Another low-flow barrier exists approximately 5,090 feet from the mouth. This barrier is approximately 4 feet in height and is passable during high flows. In addition, PG&E reports that the mouth of Flea Valley Creek is likely a barrier to upstream migrating fish during September and October because low-flow conditions result in minimal flows to the mainstem. Discharge from Flea Valley Creek during the summer can be as low as 0.5 cfs, which may prevent upstream movement.

In general, Mill Creek is steeper than Flea Valley Creek and possesses several cascades that block upstream fish movement. PG&E identified eight migration barriers in Mill Creek, seven of which are natural and one that is artificial. All eight barriers are located between the Mill Creek and NFFR confluence to approximately 2,100 feet upstream. Natural barriers consist of falls and cascades with elevation differences ranging from 5 to 25 feet. PG&E identified the box culvert where Highway 70 crosses

Mill Creek as a partial barrier based on observations of adult rainbow trout above the culvert. Three barriers (1,688, 1,818, and 2,098 feet upstream from the mouth) were identified as full barriers under all flow conditions.

Although barriers to upstream migration have been effectively documented by PG&E, conditions for the outmigration of juvenile salmonids from these two tributaries as a result of project operations has yet to be evaluated. Further, low flow conditions combined with project operation could prohibit salmonids in the mainstem from accessing thermal refugia in these coldwater tributaries. Flea Valley Creek and Mill Creek both support healthy and viable populations of rainbow trout and are important spawning areas, as described in the license application. Backpack electrofishing studies conducted by the applicant during pre-application studies indicate that Flea Valley Creek and Mill Creek are dominated by young-of-year and juvenile (1+) rainbow trout, indicating that these tributaries provide important spawning and rearing habitat. Even though project operation does not affect flow in these tributaries, because flows in Flea Valley Creek and Mill Creek can fall to as low as 0.5 and 3.0 cfs, respectively, the potential exists for hydrologic connectivity to the mainstem to be lost during summer months (e.g., changes in water level and gravel distribution). The applicant's tributary access and barrier pre-application studies indicate that low flow conditions in the NFFR and its tributaries during September and October can result in a loss of connectivity between these tributaries and the mainstem NFFR.

Our final recommendations for the duration and sampling frequencies for the other recommended monitoring studies are included in section VII, *Comprehensive Development and Recommended Alternative*.

Fish Passage

PG&E has not proposed any fish passage or dam removal activities at the Poe or Big Bend dams.

In its April 8, 2005, preliminary section 18 prescription for the Poe Project, NMFS stated that when notified, PG&E must provide funding to support trap-and-haul passage of anadromous species through or around the Poe Project. The preliminary prescription also stated that PG&E must coordinate with NMFS, other agencies, and other licensees in the Feather River watershed to provide for the protection, mitigation, and enhancement of anadromous species in the basin. Further, pursuant to section 18 of the FPA, NMFS reserved its authority to prescribe the construction, operation, and maintenance of fishways at the project. Interior also reserved its authority to prescribe fishways at the project. Both agencies indicated that sufficient information did not exist to issue a preliminary fish passage prescription.

Subsequent to their April 8 filing, NMFS amended its section 18 prescription for the Poe Project by withdrawing all preliminary recommendations for fish passage and

associated 10(j) recommendations. NMFS stated that it was reasonably certain an agreement would be reached between the NMFS, PG&E, and CDWR regarding the development of a Habitat Expansion Agreement, a draft of which was filed as an appendix to the Oroville Relicensing Settlement Agreement (see section IV.D.3). The HEA would provide greater protection for Central Valley spring-run Chinook salmon and Central Valley steelhead than would be provided by any previous recommendations for the Poe Project through the identification, evaluation, selection, and implementation of measures to best protect Central Valley spring-run Chinook salmon and Central Valley steelhead in the Feather River. As an alternative to the development of fish passage measures at individual projects throughout the Feather River, the Habitat Expansion Agreement is a comprehensive approach to protecting the most important habitat in the Feather River. The specific goal of the agreement is to expand and improve habitat to accommodate an increase of 2,000 to 3,000 adult spawning fish into the Sacramento River. As noted previously, because the Habitat Expansion Agreement has not been finalized, NMFS stated that they have reserved their authority to prescribe fishways for the Poe Project in case the agreement is not finalized and implemented in full.

As part of its terms and conditions, Interior recommended (10(j) recommendation no. 9) that PG&E develop and implement, in consultation with the resource agencies, a reconnaissance-level fish passage feasibility study for the NFFR drainage. The study would assess the potential for restoring anadromous fish access to the NFFR drainage and investigate alternatives for providing upstream and downstream anadromous fish passage around Oroville, Big Bend, and Poe dams.

In its proposed terms and conditions for the Poe Project, Butte County recommended that PG&E replace the existing non-functional fish passage structure at the Big Bend dam to allow passage of fish from Lake Oroville into the Poe bypassed reach. Similarly, the Anglers Committee recommended that the Big Bend dam be removed to improve fish movement through the bypassed reach.

Our Analysis

Big Bend Dam

Big Bend dam impounds water for a distance of approximately 4,500 feet upstream to the Poe powerhouse tailrace. The reservoir is shallow with minimal water volume and functions similarly to a continuous run or shallow pool habitat. As demonstrated by recent fish surveys conducted by the applicant, the fish community associated with Big Bend reservoir is dominated by hardhead and Sacramento sucker, both native species that actively utilize the lentic habitat provided by the dam. PG&E's fish surveys also indicate that the impoundment functions as rearing habitat for hardhead, as all captured individuals of this species were juvenile or young-of-the-year fish.

The Lake Oroville coldwater fishery is managed as a put-and-grow fishery. Hatchery raised fish are stocked as juveniles and grow in the lake before being harvested by anglers. The coldwater fishery is sustained by hatchery stocking because natural recruitment to the Lake Oroville coldwater fishery is low due to a lack of spawning and rearing habitat in the reservoir and accessible tributaries thereto, and natural and artificial barriers to migration in tributaries that block access to additional spawning and rearing habitat (FERC, 2006). Cal Fish and Game and CDWR have also indicated that a lack of quality spawning habitat is a limiting factor influencing the overall success of trout populations in reaches of the NFFR, including the Poe reach. Further studies conducted by PG&E pertaining to the suitability of spawning habitat in the Poe reach indicate that the lack of spawning gravels is a function of the high energy and canyon topography of the reach (letter filed by T. Jereb, PG&E Relicensing Coordinator, San Francisco, CA, January 13, 2004, to M.R. Salas, Secretary, FERC, Washington, DC).

The first complete barrier in the NFFR to fish migration from Lake Oroville has been identified as the Poe dam (CDWR, 2004). Studies conducted by CDWR as part of relicensing efforts at Lake Oroville indicate that upstream passage may occur at Big Bend dam during high water periods. Although not passable at all times throughout the year, opportunities for upstream migration of resident fish do exist during high flow events, when the elevation of Lake Oroville is at approximately 895.0 feet msl.

As described in the license application, PG&E assessed issues associated with fish passage at Big Bend dam, including the replacement of the inoperable fish ladder and removal of the dam (appendix E3-16 of the application). Although these actions could benefit native species (e.g., rainbow trout and hardhead) by allowing access to available habitat in the Poe bypassed reach, the report indicates that modification or removal of the dam would provide upstream passage to non-native predatory fishes, including smallmouth bass, brown trout, and other non-native species found in Lake Oroville that are not currently known to occur in the Poe bypassed reach (e.g., bluegill, redear sunfish, black and white crappie, coho salmon, and green sunfish). Many of these species are known to out-compete native fish species when in direct competition (USGS, 2006a). In 1996, CDWR evaluated the benefits of providing passage at the Big Bend dam at the request of the California Sportfishing Protection Alliance (Sportfishing Alliance). At that time, CDWR did not support the reconstruction of the fish ladder due to uncertainties as to whether the action would improve the coldwater fishery.

Poe Dam

In its November 15, 2006, filing, NMFS stated that it was reasonably certain the draft Habitat Expansion Agreement between the applicant and other involved parties would be finalized and would provide for the protection of Central Valley spring run Chinook salmon and Central Valley steelhead in the Feather River Basin. Because the Habitat Expansion Agreement is not final, however, NMFS reserved its authority to prescribe fish passage measures for the Poe Project. Assuming the Habitat Expansion

Agreement is enacted in full and the settlement parties are able to identify, evaluate, select, and implement high priority conservation measures in the Feather River watershed, fish passage at Poe dam may or may not be necessary. Further, until a comprehensive fish passage plan for the Feather River is developed, fish passage at the Poe dam would likely provide little benefit to anadromous fish until they have been passed around downstream facilities.

Fish passage measures for resident fish species were not recommended by the resource agencies in their preliminary or final terms and conditions for the Poe Project, which indicates that the passage of resident fish is not necessarily a high-priority management objective. Upstream migration above the Poe bypassed reach is blocked by the Poe dam; however, existing fish communities associated with the Poe Project consist primarily of native, non-game, and sport fish species typical of the cold and coolwater fish community in the region (see table 18). Although the construction of fish passage facilities at the Poe dam would potentially allow for resident riverine fish to move freely in both an upstream and downstream direction, fisheries information for the Poe Project demonstrates that resident fish species are sustained by existing conditions. Resident fish likely pass downstream during any high-water flow events that exceed the station's capacity of approximately 3,700 cfs.

Interior's recommendation for an anadromous fish passage feasibility study (Interior 10(j) recommendation no. 9) would include the evaluation of potential fish passage measures at Poe, Big Bend, and Oroville dams. As part of its license application, PG&E conducted a reconnaissance-level assessment of fish passage at the Poe Project. The study found that fish passage structures for adult fish such as a ladder, lift facility, or trap and haul operation could be implemented at Poe dam. The report also indicates that a screening facility with a capacity of 3,700 cfs could be successfully built at Poe dam to collect outmigrating juvenile salmonids. With respect to the feasibility of fish passage at Oroville dam, the responsibility for a study of fish passage rightly belongs to its owner, CDWR, who has already conducted a fish passage feasibility study as part of its relicensing effort for the Oroville Project.

We analyze the costs of measures proposed or recommended for aquatic resources in section VI, *Developmental Analysis*, and make our final recommendations in section VII, *Comprehensive Development and Recommended Alternative*.

c. Cumulative Effects:

Hydroelectric development, mining practices, road and railroad construction, and land use practices over the last 150 years have all adversely affected aquatic resources in the NFFR basin. Construction of upstream and downstream hydroelectric projects and associated reservoirs (Upper North Fork, Rock Creek-Cresta, and Oroville) has reduced the total amount of riverine habitat in the NFFR from approximately 90 miles under

historic conditions to 41 miles (PG&E, 2002). Current riverine habitat is divided among the Seneca, Belden, Rock Creek, Cresta, and Poe bypassed reaches. Although some of the reservoirs in the Feather River Basin provide suitable rearing habitat for rainbow trout, the fish communities in impounded areas have generally shifted toward warmwater species. Continued operation of the Poe Project would likely affect the aquatic biota in the Poe bypassed reach through the alteration to instream flows, water temperature, and sediment movement through the reach.

NMFS, Interior, CDWR, PG&E, and other parties have executed a settlement agreement for the relicensing of CDWR's Oroville Project, which is directly downstream of the Poe Project. Included in the SA filed with the Commission (March 24, 2006) is a draft Habitat Expansion Agreement that describes measures to be undertaken by the settlement parties to identify high priority restoration efforts in the Sacramento River basin for the preservation and conservation of Central Valley spring-run Chinook salmon and Central Valley steelhead and associated habitat. The specific goal of the Habitat Expansion Agreement is to expand and improve habitat in the Feather River basin to accommodate an increase of 2,000 to 3,000 adult spawning fish into the Sacramento River.

Dam construction on the Feather River has adversely affected populations of salmon in several ways, including, but not limited to obstructing migrations, decreasing habitat availability, increasing competition and redd superimposition below dams, and genetic transgression. The implementation of the Habitat Enhancement Agreement as currently proposed would aid in the mitigation of the cumulative adverse effects that hydroelectric projects in the NFFR have had on anadromous salmonids. Because PG&E would be a settlement party, if the final Habitat Expansion Agreement is implemented, these actions would potentially mitigate for the long-term effects that hydroelectric facilities have had on salmon runs in the Feather River.

Historic mining operations during the mid to late 1800s adversely affected aquatic biota and associated aquatic habitat in the NFFR in numerous ways. Habitat destruction through hydraulic mining, water diversions and blockages, increased deposition of fine sediments and debris, water pollution, and increased turbidity affected the condition of the fishery and destroyed spawning grounds, resulting in a rapid decline in the salmonid fishery (Yoshiyama et al., 2001). Small-scale mining continues at present and is expected to continue in the future. However, the severe environmental impacts associated with historical mining operations are not likely to reoccur.

The Commission has recently relicensed one project on the NFFR (Rock Creek-Cresta) and is in the process of relicensing two others (Oroville and Upper North Fork Feather River). The same aquatic resources issues relevant to the Poe Project (e.g., water temperature modifications, recreational flow releases, instream flows) are likely to be or have already been raised and addressed during the relicensing proceedings for these other

projects. Environmental measures that are implemented for these projects have the potential to affect the aquatic resources associated with the Poe Project.

PG&E is currently involved in efforts to address daily mean water temperature issues upstream of the Poe Project as part of the Rock Creek-Cresta Project and UNFFR Project relicensing efforts to improve summer conditions for the downstream coldwater fish community. Measures evaluated by PG&E include the installation of a thermal curtain in Lake Almanor, the upstream-most storage reservoir (for FERC No. 2105), physical modifications to the Prattville intake structure, and alterations to project operations. The Prattville intake draws water from Lake Almanor for the Butt Valley powerhouse, which is subsequently conveyed downstream via a combination of power generation penstocks and the NFFR channel to Lake Oroville. Under current operations, the Prattville intake draws water from throughout the Lake Almanor water column, which can result in the release of water that regularly exceeds 20°C.

Because water temperature in the Poe bypassed reach is largely dependent on upstream conditions, any improvements in water temperature at upstream projects would be expected to benefit fisheries associated with the Poe Project. Any decrease in the temperature of inflowing water would cumulatively interact with water temperature reductions from measures implemented at the Poe Project to enhance the coldwater fishery in the Poe bypassed reach and downstream to where the NFFR enters Oroville reservoir.

As part of the Rock Creek-Cresta SA, PG&E implemented a temperature-conditioned relative suitability index study to evaluate the potential effects that changes in water temperature could have on targeted fish species and aquatic habitat in the bypassed reaches of the NFFR. The study indicated that modifications to the upstream thermal budget, through the installation of temperature control devices or other operational modifications, would increase suitable habitat for rainbow trout and decrease suitable habitat for native minnows and suckers in the Poe bypassed reach because of the difference in preferred temperature ranges for these species (TRPA, 2004). Depending on the water year used and the species evaluated, changes in temperature-conditioned relative suitable habitat in the Poe reach ranged from +24 percent for juvenile rainbow trout to -71.5 percent for smallmouth bass (table 24). The analysis reported in table 24 was conducted with a minimum flow of 150 cfs. If higher minimum flows are implemented (such as the agency or staff regime), greater improvements in suitable habitat for rainbow trout could occur, while other species could experience a greater loss in suitable habitat

The aquatic resource measures proposed by PG&E, specified by the Forest Service, recommended by Interior, Cal Fish and Game, and Butte County, and identified by the Commission staff provide a reasonable means to address cumulative effects in the NFFR basin. The measures are designed to improve the overall condition of the aquatic

Table 24. Percent change in temperature-conditioned relative suitable habitat in the Poe bypassed reach, North Fork Feather River, CA, with implementation of upstream water temperature reduction measures and a 150 cfs minimum instream flow. (Source: PG&E, 2003, as modified by staff)

Species	Normal Water Year				Critically Dry Water Year			
	June	July	August	Sept.	June	July	August	Sept.
Rainbow trout - juvenile	0.0	5.5	3.0	0.0	-1.4	16.3	24.0	0.0
Rainbow trout - adult	0.0	5.4	3.0	0.0	0.1	16.1	23.6	0.0
Sacramento sucker - juvenile	-3.6	-7.9	-7.6	-3.5	-11.0	-4.9	-0.7	-3.6
Sacramento sucker - adult	-3.6	-7.9	-7.6	-3.5	-11.0	-4.9	-0.6	-3.6
Hardhead - juvenile	-3.6	-10.0	-8.7	-3.5	-11.0	-10.4	-8.1	-3.6
Hardhead - adult	-3.6	-10.0	-8.7	-3.5	-11.0	-10.4	-8.1	-3.6
Sacramento pikeminnow - juvenile	-3.6	-10.0	-8.7	-3.5	-11.0	-10.4	-8.1	-3.6
Sacramento pikeminnow - adult	-3.6	-10.0	-8.7	-3.5	-11.0	-10.4	-8.1	-3.6
Smallmouth bass	-34.7	-56.4	-61.5	-23.5	-71.5	-37.3	-0.7	-48.8

resources in the NFFR, which have been impaired as a result of anthropogenic activity in the basin. In addition, these measures are aimed at improving ecosystem processes and function in the NFFR basin in an effort to balance aquatic resources with hydroelectric operations. Specifically, measures that are expected to provide benefits to the aquatic biota in the Poe bypassed reach and to have a beneficial cumulative effect on basin resources include:

- the provision of pulse flows to entrain and recruit gravel for the improvement of spawning habitat and to enhance channel functionality;
- increasing minimum flows in the bypassed reach to increase physical habitat for fish and macroinvertebrates;
- decreasing summer water temperatures in the bypassed reach; and

- establishing a ramping rate for spill and pulse flows to avoid rapid onset and termination of flows that may disrupt or displace aquatic biota downstream.

d. Unavoidable Adverse Effects:

Continued operation of the Poe Project would result in some continuing effects on aquatic resources, including the loss of riverine habitat by the presence of the reservoir, blockage of upstream fish movement by project dams, loss of fish through entrainment and turbine passage, the interruption of sediment transport processes, and the alteration of water temperature and flow regimes.

3. Terrestrial Resources

a. Affected Environment:

Vegetation

The Poe Project is within the Plumas National Forest at an elevation of approximately 1,000 to 1,400 feet in the Sierra Nevada foothills. Within 1 mile of the project, elevations extend up to about 3,000 feet on the slopes of the NFFR canyon. Within the project vicinity, six plant communities (as defined by Sawyer and Keeler-Wolf, 1995) are represented. These include canyon live oak, foothill pine-canyon live oak, mixed conifer, black oak, wedgeleaf ceanothus, and California annual grassland. There are also additional areas throughout the project area that have been developed or disturbed. These communities overlap, forming broad ecotones instead of having sharply defined boundaries.

The canyon live oak community is characterized by widely spaced, broad-leaved trees to about 65 feet in height with a shrub understory. Canyon live oak is widespread throughout the project vicinity, occurring on both granite and metasedimentary soils. The foothill pine-canyon live oak community is comprised of a moderately dense understory of evergreen sclerophyllous⁸ shrubs with an open canopy of foothill pine. This community occurs on serpentine soils upstream of the Bardee's Bar area. The mixed conifer community is characterized by a moderately dense forest of coniferous evergreens dominated by ponderosa pine, Douglas fir, and incense cedar. This community occurs on relatively gentle slopes within the project vicinity, away from the steep, rocky river canyon walls. Black oak community is moderately dense woodland dominated by black oak with Douglas fir, Ponderosa pine, and foothill pine. Small pockets of black oak occur throughout the project vicinity, particularly on north-facing slopes. Wedgeleaf ceanothus is characterized by a dense chaparral to about 10 feet in

⁸Plants with hard leaves, short distances between leaves on the stems, and that resist dry conditions.

height. Small pockets of this community occur on serpentine soils south of Poe powerhouse. The California annual grassland community is characterized by a sparse to dense cover of annual non-native grasses including ripgut brome, soft chess, and wild oat. Within the vicinity of the project, small areas of annual grassland occur as disturbed openings under transmission lines. Additional small areas of annual grassland are associated with areas of serpentine soils.

Riparian vegetation was mapped by PG&E in 2000 using infrared digital aerial photography during instream flows of approximately 115 cfs. Additional digital aerial orthophotography was analyzed during flows of approximately 1,400 cfs to determine the areal coverage of riparian vegetation during high-flow conditions. The area of coverage included the NFFR from Cresta powerhouse to Big Bend dam. Nine different plant communities were observed (as defined by Sawyer and Keeler-Wolf 1995): torrent sedge, California brickelbush, arroyo willow, narrowleaf willow, Himalayan blackberry, foothill sycamore-arroyo willow, white alder (immature), white alder (mature), and Oregon ash. Descriptions of these communities along with their areal coverage at both flows of 115 and 1,400 cfs are presented in table 25.

Special Status Plant Species

PG&E conducted rare plant surveys in May-June 1999 and March-August 2000. The list of special status plants to survey for was determined by a literature search of FWS, Cal Fish and Game, Forest Service, and California Native Plant Society (CNPS) lists. Special status plant species were defined as those plant species listed, proposed, or under review as rare, threatened, or endangered by the federal government or the State of California, those listed by the CNPS, and those listed as sensitive or of special interest by the Forest Service. The survey area included (1) all areas with the project boundary, (2) access roads to project facilities, and (3) water fluctuation zones within river reaches below project facilities. Forty-eight occurrences of 12 special status plant species were observed within the survey area. No state or federally listed threatened, endangered, or candidate species were observed. Special status species located during the surveys are shown in table 26.

Noxious Weeds

Noxious weeds in the project area were documented during the rare plant surveys. Thirty-six occurrences of five noxious weeds were documented in the project area. No California Department of Food and Agriculture (CDFA) A-rated pest plants were observed. One population of barbed goatgrass, a CDFA B-rated species, was observed at the base of Bardee's Bar Road. Yellow star thistle, Klamathweed, and bouncing bet, all CDFA C-rated species, were also observed in the project area. There are 14 medium to large populations of yellow star thistle, with the largest number in the vicinity of the Poe

Table 25. Areal coverage of riparian vegetation series at low flow and high flow within the Poe Project area. (Source: PG&E, 2003)

Vegetation Series	Habitat and Occurrences Within the Project Vicinity	Areal Cover (square meters) at 115 cfs	Areal Cover (square meters) at 1,400 cfs
Torrent sedge (wetland herb)	Perennial herbs growing at water's edge dominated by Torrent sedge (<i>Carex nudata</i>). Dependent on stable summer water levels.	18,073	11,656
California brickellbush (dry herb)	Sparse vegetation cover of dry site herbs dominated by California brickellbush (<i>Brickellia californica</i>). Occurs on gravel and cobble bars above the summer water's edge.	24,022	19,436
Arroyo willow	Open to dense streamside thicket dominated by a mix of willows: arroyo willow (<i>Salix lasiolepis</i>), Pacific willow (<i>S. lucida</i> ssp. <i>lasiandra</i>), and narrowleaf willow (<i>S. exigua</i>). Occurs on water's edge and is subject to annual flooding.	52,587	46,278
Narrowleaf willow	Disturbed streamside sites dominated by narrowleaf willow. Generally occurs on open sites on gravel and cobble bars.	36,865	31,498
Himalayan blackberry	Dense thickets of Himalayan blackberry (<i>Rubus discolor</i>) with aerial cover values in excess of 80 percent. Occurs in a nearly continuous band along the west shore of Poe reservoir.	24,481	24,262

Vegetation Series	Habitat and Occurrences Within the Project Vicinity	Areal Cover (square meters) at 115 cfs	Areal Cover (square meters) at 1,400 cfs
Foothill sycamore- arroyo willow	Open woodland away from active channel and at or above the ordinary high water mark. Dominated by western sycamore (<i>Platanus racemosa</i>) and arroyo willow. Occurs away from active channel from Bardee's Bar to Poe powerhouse.	104,596	85,317
White alder (immature stands)	Open thicket dominated by white alder (<i>Alnus rhombifolia</i>) seedlings and saplings. Occurs on somewhat unstable fluvial surfaces of gravel and cobble.	19,819	19,764
White alder (mature stands)	Streamside stands of mature white alder occurring in several areas along the shore of Poe reservoir as a one-canopy wide stand.	12,929	12,929
Oregon ash	Open stands of mixed age Oregon ash (<i>Fraxinus latifolia</i>) occurring on higher, stable terraces. Two small stands were mapped between Pulga bridge and Poe dam.	7,258	5,794
Non-native grassland		3,240	3,148
Ruderal		29,428	29,428
Bare ground		290,434	246,066
	Total	623,732	535,576

Table 26. Special status plant species that are known to occur within the Poe Project area. (Source: PG&E, 2003)

Species	Status	Habitat and Occurrences Within the Project Vicinity
Jepson's onion (<i>Allium jepsonii</i>)	FSS, CNPS 1B	Butte and Tuolumne counties at elevations ranging from 1,000 to 3,600 feet. Three populations were documented during PG&E's surveys on Bardee's Bar Road just above the NFFR and one population was observed adjacent to the NFFR just south of the old Bardee's Bar bridge. Threats include invasive exotic species and road maintenance activities.
Butte County calycadenia (<i>Calycadenia oppositifolia</i>)	FSS, CNPS 1B	Butte County at elevations ranging from 650 to 3,000 feet. Two low cover populations were documented during PG&E's surveys in sunny, grassy openings and flats on serpentine soils near the Poe powerhouse. Threats include yellow star-thistle (<i>Centaurea solstitialis</i>).
Dissected-leaf toothwort (<i>Cardamine pachystigma</i> var. <i>dissectifolia</i>)	FSI, CNPS 3	Butte, Mendocino, Placer, and Sonoma counties at elevations ranging from 800 to 6,700 feet. One population of one individual was documented during PG&E's surveys in a shaded serpentine drainage adjacent to Bardee's Bar Road. Threats include road maintenance activities.
White-stemmed clarkia (<i>Clarkia gracilis</i> ssp. <i>albicaulis</i>)	FSS, CNPS 1B	Butte County at elevations ranging from 750 to 3,500 feet. Five populations were documented during PG&E's surveys along the edge of Poe Powerhouse Road and one population was found on the east side of Pulga bridge. Threats include road maintenance activities and yellow star-thistle.

Species	Status	Habitat and Occurrences Within the Project Vicinity
Mildred's clarkia (<i>Clarkia mildredae</i> ssp. <i>mildredae</i>)	FSI, CNPS 1B	Butte and Placer counties at elevations ranging from 900 to 5,500 feet. Two populations were documented during PG&E's surveys just below the railroad tracks above Poe reservoir. Also observed was one small population of the closely related golden-anthered clarkia (<i>C. mildredae</i> ssp. <i>lutescens</i>) near the Poe powerhouse.
Mosquin's clarkia (<i>Clarkia mosquinii</i> ssp. <i>mosquinii</i>)	FSS, CNPS 1B	Endemic to the Feather River drainage at elevations ranging from 975 to 3,750 feet. Three populations were documented during PG&E's surveys along the Poe powerhouse access road. Threats include road maintenance activities.
Northern Sierra daisy (<i>Erigeron petrophilus</i> var. <i>sierrensis</i>)	FSI, CNPS 4	Butte, El Dorado, Nevada, Plumas, Sierra, and Yuba counties at elevations ranging from 1,700 to 4,700 feet. Four populations, ranging from 12 to 40 feet above the high water mark, were documented during PG&E's surveys at Poe powerhouse, Bardee's Bar, and east of the Pulga bridge.
Cantelow's lewisia (<i>Lewisia cantelovii</i>)	FSS, CNPS 1B	Butte, Nevada, Plumas, Shasta, and Sierra counties at elevations ranging from 1,200 to 4,400 feet. Two populations were documented during PG&E's surveys adjacent to Poe reservoir, and a third population was recorded east of the Pulga bridge. Threats include horticulture collecting and road and trail maintenance activities.

Species	Status	Habitat and Occurrences Within the Project Vicinity
Humboldt's lily (<i>Lilium humboldtii</i> ssp. <i>humboldtii</i>)	FSI, CNPS 4	Widespread from Tehama to Tuolumne counties in the Sierra Nevada at elevations ranging from 290 to 3,500 feet. Populations were documented during PG&E's surveys near Pulga bridge and below Bardee's Bar. Threats include Himalayan blackberry.
Shield-bracted monkeyflower (<i>Mimulus glaucescens</i>)	FSI, CNPS 4	Butte, Colusa, Lake, Nevada, Shasta, and Tehama counties at elevations ranging from 190 to 3,900 feet. Populations were documented during PG&E's surveys at Bardee's Bar, Pulga bridge, and Poe powerhouse.
Cut-leaved ragwort (<i>Senecio eurycephalus</i> var. <i>lewisrosei</i>)	FSS, CNPS 1B	Butte and Plumas counties at elevations ranging from 950 to 4,700 feet. Twelve populations were documented during PG&E's surveys from Bardee's Bar up river to Pulga bridge. Threats include road maintenance activities.
California nutmeg (<i>Torreya californica</i>)	No special status.	Widespread throughout California, but uncommon in the Poe Project area. Two populations totaling three individuals were documented during PG&E's surveys in the Bardee's Bar area.

Notes: FSS = Forest Service sensitive species

FSI = Forest Service special interest

FW = Forest Service watch list

CNPS 1B = rare or endangered in California and elsewhere

CNPS 2 = rare or endangered in California, but more common elsewhere

CNPS 3 = plants for which more information is needed

CNPS 4 = plants of limited distribution

powerhouse, observed in the NFFR corridor. Twelve medium-sized populations of Klamathweed were observed between Pulga Bridge and Poe powerhouse. Bouncing bet occurs in a nearly continuous band of plants along both sides of NFFR from Pulga Bridge to Poe powerhouse. Himalayan blackberry, an invasive species not currently listed by

CDFA, is prevalent on project lands, forming a nearly continuous band along the west shore of Poe reservoir. Two additional populations were observed just upstream of Pulga Bridge.

Wildlife

Major habitat types found within 1 mile of the project include: fresh emergent wetland, annual grassland, orchard/vineyard, montane hardwood, montane riparian, ponderosa pine, Sierra mixed conifer, montane hardwood-conifer, riverine, and lacustrine. The project is within the French Creek Management Area, as designated by the Plumas National Forest, and is managed for winter habitat for band-tailed pigeons, northern goshawk, California spotted owl, deer winter range, and bald eagle. The state of California has identified two Significant Natural Areas within the vicinity of the project. They are the Great Valley Cottonwood Riparian Forest and the Northern Basalt Flow Vernal Pools.

Black-tailed deer and mule deer are the most abundant big game species in the Plumas National Forest. The Bucks Mountain Herd occurs in the vicinity of project. This herd peaked in size in 1963-67 with an estimated population of 8,467. The population in 1985 was estimated at 3,015 deer. The Bucks Mountain Management Plan has a goal of maintaining a population of at least 4,000 deer. Other mammals occurring in the project area include beaver, mink, and muskrat in the lacustrine and wetland habitats and black bear, snowshoe hare, and bobcat in the montane habitats.

Poe reservoir and the NFFR provide habitat for a number of water-dependent bird species such as Canada goose, wood duck, common goldeneye, other waterfowl, and shorebirds. Upland bird species such as California quail, mountain quail, blue grouse, mourning dove, ring-necked pheasant, and wild turkey are found in the mountain hardwood and montane hardwood-conifer habitats. Bullfrogs are a commonly found amphibian species.

Special Status Wildlife Species

PG&E conducted surveys in 1999-2000 for several federally listed and state listed and other sensitive species that potentially occur in the immediate project vicinity. All special status species that have the potential to occur in the immediate project area are shown in table 27. Those species for which surveys were conducted include the federally listed bald eagle (*Haliaeetus leucocephalus*), California red-legged frog (CRLF) (*Rana aurora draytonii*), and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), which are discussed in section V.C.4, *Threatened and Endangered Species*. Other species are the peregrine falcon, northern goshawk, California spotted owl, willow flycatcher, Pacific fisher, river otter, foothill yellow-legged frog (FYLF), and western pond turtle. With the exception of one adult peregrine that was observed flying down the canyon over Poe powerhouse in the direction of Lake Oroville in May 2000, none of

these species were located during the PG&E surveys. FYLF were observed in the project area during targeted Garcia and Associates (GANDA) surveys in 1999 through 2006.

Potential peregrine falcon and northern goshawk nesting habitat in the project area is sub-optimal. Although suitable habitat was available in the project area for California spotted owls and willow flycatchers, none were observed during surveys. Bat surveys did not locate Townsend's big-eared bat or the pallid bat, but they did obtain acoustic records of the western red bat in six locations. Two locations were adjacent to the NFFR, two were within riparian habitats within about 300 feet of the river, and two were 1 to 1.5 miles away from the river, upslope.

Western Pond Turtle

Western pond turtle is a federal species of special concern, a Forest Service Region 5 sensitive species, and a California special concern species. Western pond turtle surveys were conducted in conjunction with the general amphibian surveys conducted by PacifiCorp's consultant, GANDA, in June 2000, along the NFFR from Poe reservoir to Poe powerhouse (GANDA, 2002a). The survey areas included riverine pools, side channels, backwaters, and tributary confluences. A single adult western pond turtle was observed basking on a rock in a large pool upstream of Poe powerhouse and less than 1,000 feet above Big Bend reservoir during this survey. Western pond turtles prefer low flow rivers, side channels, and backwater areas with access to deep slow water with underwater refugia. There were other areas of potential habitat for this species in Poe reservoir and Big Bend reservoir, although no other turtles were sighted. An additional survey specifically for western pond turtles at Big Bend reservoir was completed in October of 2000. No turtles were observed during this survey, or incidentally during the multi-year FYLF surveys.

Foothill Yellow-legged Frog

FYLF is a federal species of special concern, a Forest Service Region 5 sensitive species, and a California special concern species. FYLF occurs in the coast ranges from the Oregon border south to the Transverse Mountains in Los Angeles County; in most of northern California west of the Sierra Cascade crest; and along the coast ranges north of Monterey from sea level to 1,830 meters (6,000 feet) in the Sierra Nevada mountains.

The FYLF is typically found in small, low gradient, rocky streams with exposed boulders that provide sunning spots for adults. During the non-breeding season, frogs are resident in tributary streams, and individuals are often found in the same location during multiple NFFR surveys. Breeding frogs use wide, shallow reaches near the mouths of tributaries. The females attach egg masses to cobbles and boulders in shallow, slow-moving backwaters and in depositional areas such as point bars and cobble/boulder bars at pool outlets.

Table 27. Special status wildlife species potentially occurring in the project area.
(Source: PG&E, 2003)

Species	Status ^a	Optimum Habitat ^b
Birds		
American white pelican (<i>Pelecanus erythrorhynchos</i>)	CSC	Lacustrine
Bald eagle (<i>Haliaeetus leucocephalus</i>)	SE, FT, CP	Lacustrine, riverine
Bank swallow (<i>Riparia riparia</i>)	ST	Montane riparian
Barrow's goldeneye (<i>Bucephala islandica</i>)	CSC	Lacustrine
Black tern (<i>Chlidonias niger</i>)	CSC	Lacustrine, fresh emergent wetlands
California gull (<i>Larus californicus</i>)	CSC	Lacustrine, riverine, montane riparian
Common loon (<i>Gavia immer</i>)	CSC	Lacustrine
Cooper's hawk (<i>Accipiter cooperi</i>)	CSC	Montane riparian
Dark-eyed junco (<i>Junco hyemalis caniceps</i>)	CSC	Montane hardwood-conifer
Double-crested cormorant (<i>Phalacrocorax auritus</i>)	CSC	Riverine, lacustrine
Ferruginous hawk (<i>Buteo regalis</i>)	CSC	Annual grassland
Golden eagle (<i>Aquila chrysaetus</i>)	CP, CSC	Montane hardwood-conifer
Horned lark (<i>Eremophila alpestris actia</i>)	CSC	Annual grassland
Loggerhead shrike (<i>Lanius ludovicianus</i>)	CSC	Annual grassland
Long-billed curlew (<i>Numenius americanus</i>)	CSC	Wet meadow
Long-eared owl (<i>Asio otus</i>)	CSC	Montane riparian
Merlin (<i>Falco columbarius</i>)	CSC	Montane hardwood-conifer
Northern goshawk (<i>Accipiter gentilis</i>)	CSC, Forest Service	Montane hardwood-conifer
Northern harrier (<i>Circus cyaneus</i>)	CSC	Annual grassland, fresh emergent wetland
Osprey (<i>Pandion haliaetus</i>)	CSC	Lacustrine, riverine, montane hardwood

Species	Status^a	Optimum Habitat^b
Peregrine falcon (<i>Falco peregrinus</i>)	SE, Forest Service, CP	Montane riparian
Prairie falcon (<i>Falco mexicanus</i>)	CSC	Annual grassland
Purple martin (<i>Progne subis</i>)	CSC	Montane riparian
Sharp-shinned hawk (<i>Accipiter striatus</i>)	CSC	Montane riparian, montane hardwood
Short-eared owl (<i>Asio flammeus</i>)	CSC	Annual grassland, wet meadow
California spotted owl (<i>Strix occidentalis occidentalis</i>)	FSC, CSC, Forest Service	Montane hardwood-conifer
Great gray owl (<i>Strix nebulosa</i>)	Forest Service	Montane hardwood-conifer
Swainson's hawk (<i>Buteo swainsoni</i>)	ST	Montane riparian
Tricolored blackbird (<i>Agelaius tricolor</i>)	CSC	Annual grassland, wet meadow, fresh emergent wetland
Vaux's swift (<i>Chaetura vauxi</i>)	CSC	Montane hardwood-conifer
Black shouldered kite (<i>Elanus caeruleus</i>)	CP	Annual grassland
Willow flycatcher (<i>Empidonax traillii</i>)	FE, SE, CSC	Montane riparian, wet meadow
Yellow warbler (<i>Dendroica petechia brewsteri</i>)	CSC	Montane riparian
Yellow-breasted chat (<i>Icteria virens</i>)	CSC	Montane riparian
Mammals		
Pacific fisher (<i>Martes pennanti pacifica</i>)	CSC, Forest Service	Montane hardwood-conifer, montane riparian
Pallid bat (<i>Antrozous pallidus</i>)	CSC, Forest Service	Montane hardwood-conifer
Western red bat (<i>Lasiurus blossevillii</i>)	CSC, Forest Service	Montane hardwood-conifer
Sierra Nevada red fox (<i>Vulpes vulpes necator</i>)	ST, Forest Service	Montane hardwood-conifer, montane riparian
Ringtail (<i>Bassariscus astutus</i>)	CP	Montane hardwood-conifer
Sierra Nevada snowshoe hare (<i>Lepus</i>)	CSC	Montane riparian, wet meadows

Species	Status ^a	Optimum Habitat ^b
<i>americanus tahoensis</i>)		
Townsend's big-eared bat (<i>Plecotus townsendii pallescens</i>)	CSC, Forest Service	Montane hardwood-conifer
Pine marten (<i>Martes americanus</i>)	Forest Service	Montane hardwood-conifer
River otter (<i>Lutra canadensis sonora</i>)	CSC	Riverine, montane riparian
Reptiles		
California horned lizard (<i>Phrynosoma coronatum frontale</i>)	CP, CSC	Montane riparian
Western pond turtle (<i>Clemmys marmorata marmorata</i>)	CP, CSC	Montane riparian, riverine
Amphibians		
Foothill yellow-legged frog (<i>Rana boylei</i>)	CP, CSC, Forest Service	Lacustrine, wet meadows, montane riparian
California red-legged frog (<i>Rana aurora draytonii</i>)	FT, CP, CSC	Montane riparian
Western spadefoot toad (<i>Scaphiopus hammondi</i>)	CP, CSC	Orchard-vineyard, annual grassland
Insects		
Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	FT	Riparian, uplands

^a The status of listed species includes:

SE = Listed as *Endangered*, by the State of California

ST = Listed as *Threatened*, by the State of California

CSC = Listed as *Species of Special Concern*, by the State of California

CP = Listed as *Protected Species*, by the State of California

FE = Federally listed as *Endangered*

FT = Federally listed as *Threatened*

Forest Service = Forest Service, Region 5, *Sensitive Species*

^b Information obtained from the California Natural Diversity Database (CNDDDB)

Newly emerged tadpoles remain around the egg masses for several days before dispersing into the gravel or moving downstream to areas of moderate flow. Breeding sites are often separated by large distances of hundreds or thousands of meters. After breeding, adults disperse to deep pools. By fall and winter adult males and females are

found primarily near pools, while juveniles are found at riffles on mainstem rivers. Tributaries are used by both juveniles and adults as refuges from summer heat and high water flows in winter and spring.

In the NFFR, FLYF egg laying usually follows a period of high flow associated with winter rainfall and snowmelt, mostly in May and early June, although sometimes beginning as early as March or as late as July depending on the water year. Eggs hatch in 5 to 36 days, and tadpoles metamorphose in 3 to 4 months.

The 1999 through 2005 NFFR FYLF surveys included general and focused studies to determine the presence and distribution of the frogs before, during, and after high flows, as well as local life history information. The following information is taken from the survey reports (GANDA, 2003; 2004a; 2004b; 2004c; and 2006) unless otherwise cited.

FYLF were found in multiple locations along the NFFR in the project area including (1) at the mouth of Mill Creek; (2) downstream of the mouth of Mill Creek; (3) in the vicinity of the mouth of Flea Valley Creek; (4) Bardee's Bar; (5) approximately 0.5 mile upstream of Poe powerhouse (Swimmer's Beach); and (6) adjacent to the Poe powerhouse. Tadpoles, metamorphs, juveniles, and adults were all found in these lower gradient areas of Poe reach. The 2000 through 2005 GANDA surveys all found FYLF most plentiful in the upper section of the Poe reach, near Mill and Flea Valley creeks. A total of 418 individual frogs were identified in the Poe reach in 2004 and 2005, compared to only 58 individuals (11 males, 47 females) in the Cresta reach during these years. In 2006, only 4 FYLF egg masses, and 5 adult females and 4 males (not necessarily different individuals) were observed in the Cresta reach (A. Lind, Forest Service Sierra Nevada Research Center herpetologist, September 12, 2006, letter attached to Plumas National Forest September 29, 2006, draft EA comments).

The mean daily temperature in the NFFR tributaries was above 10°C in 2004 and 2005 when frogs began moving towards the river; the males began moving from tributaries to the river before females. Both males and females were found at Poe reach breeding sites in late March 2004. In 2005, the first male was detected moving to the main river from Flea Valley Creek on February 23; the first female was moving to the Poe reach on April 1. The mean dates that females moved to the river were not significantly different in 2004 and 2005 (May 9 and May 5, respectively), and the mean air and water temperatures and the 10-day accumulated precipitation were not significantly different, leading GANDA (2006) to conclude that day length is the primary stimulus initiating breeding migrations rather than other environmental variables.

Females have initiated breeding as early as April 17 and as late as May 15 in the Poe reach. GANDA surveys found most of the egg masses and tadpole groups in relatively shallow water, close to shore. In 2001 and 2002, the mean depth to the riverbed at egg mass oviposition sites was 25 centimeters (about 10 inches). The mean

distance to shore was 166 centimeters (5.5 feet) in 2001 and 156 centimeters (5 feet) in 2002. The mean depth to the bottom at tadpole group locations was 19 centimeters (7.5 inches) in 2001 and 21 centimeters (8.25 inches) in 2002. Mean distance to shore for tadpole groups was 94 centimeters (3 feet) and 158 centimeters (5 feet) in 2001 and 2002, respectively. Mean flow velocities at egg mass attachment sites were low, 1.4 and 2.2 centimeters/second (0.05 to 0.07 fps) in 2001 and 2002. Mean flow velocities at tadpole group locations were also low, 0.6 centimeters/second (0.02 fps) for both years. In 2003, 96 percent of tadpole groups were observed in edgewater habitats less than 50 centimeters (20 inches) deep, less than 20 centimeters/second (0.7 fps) water velocity, and less than 5 meters (16 feet) from shore.

In general, reproduction in the sampled portions of the project appeared to be successful in 2001, 2002, 2003, and 2005 with adequate egg laying and hatching success and some juvenile recruitment evident in most substrates. The 2001 through 2005 GANDA surveys indicate the most successful reproduction occurs near the confluence of Flea Valley Creek and about 800 meters downstream from the confluence of Mill Creek and the river. For example, in 2003, a total of 49 egg masses were observed at 6 sites, 31 of them in the Flea Valley Creek/Mill Creek site (GANDA, 2004b).

b. Environmental Effects:

Effects of Project Operations on FYLF

Surveys conducted by PG&E from 1999 through 2005 located FYLF in numerous locations along the NFFR within the project area. FYLF typically breed in low velocity, shallow water, and surveys noted that egg masses have been detached due to high flows. PG&E proposes; FWS, Cal Fish and Game, and Butte County recommend; and the Forest Service prescribes various changes in project operations, including higher minimum instream flows to improve fish habitat, pulse flows, temperature moderation flows to improve fish habitat, and whitewater recreation flow releases in addition to unscheduled operational pulse flows that have the potential to affect FYLF.

Minimum Instream Flows

PG&E proposes to maintain a continuous, year-round minimum instream flow of 150 cfs in the NFFR, as measured at the Pulga gage (NF23). This is an increase from the current license requirement of 50 cfs. PG&E proposed this increased minimum instream flow as a balance between higher flows to enhance fisheries habitat and lower flows that would protect FYLF egg masses and tadpoles.

PG&E also proposes to monitor the responses of fishes, amphibians, macroinvertebrates, bald eagles, and riparian vegetation to new instream flows. FYLF monitoring studies would focus on determining the direct and indirect effects of the

proposed base flow on all life stages of FYLF and their habitats, as well as identifying some of the limiting factors affecting the Poe reach population.

We describe the Forest Service specified, revised agency recommended, and staff-identified flow regimes in sections V.C.1, *Water Resources*, and V.C.2, *Aquatic Resources*. Those flow regimes are intended to mimic the natural hydrograph by increasing instream flows monthly from October to peak high flows in March, April, or May, and then step down flows monthly from April to September. Table 28 summarizes the minimum flows that would occur during the FYLF reproductive season under the various flow regimes. The objective of the recommended minimum flows is to provide sufficient habitat for both coldwater fishes and FYLF. For further information on the effects of minimum instream flows on coldwater fishes and macroinvertebrates, see section V.C.2, *Aquatic Resources*.

Table 28. Minimum flows (in cfs) during FYLF breeding and rearing seasons under the various flow regimes. (Source: Staff)

Month	Water Year Type				
	All PG&E	Wet Agencies/ Staff	Normal Agencies/ Staff	Dry Agencies/ Staff	Critically Dry Agencies/ Staff
March	150	350/250	350/225	300/215	300/210
April	150	400/275	400/250	325/215	300/210
May	150	500/300	400/275	350/200	300/200
June	150	500/250	400/225	350/180	300/180
July	150	425/225	400/200	350/180	300/165
August	150	350/225	350/200	260/180	260/165
September	150	300/225	300/200	180/165	180/165

NPS, in its September 14, 2006, draft EA comments states that the frogs found suitable breeding habitat (in 2006) at much higher flows than those recommended by PG&E's consultant. It concludes that the only way to protect FYLF during the breeding season is to provide higher, stable instream flows during the period.

Our Analysis

The staff-identified minimum flows for March through September, when FYLF are in the river, would range from 300 to 165 cfs depending on the month and water year type (table 28). The agencies' specified or recommended minimum flows for this time period would range from 500 to 180 cfs depending on the month and water year type.

Initially, GANDA concluded that optimal FYLF breeding and tadpole rearing habitat in the Poe reach decreased as instream flows increased above 150 cfs, and that 150 cfs provided the greatest amount of suitable habitat based on 2002 and 2004 data (GANDA, 2004c). We concurred with the GANDA conclusion in our DEA. The results of the 2005 and 2006 FYLF monitoring, however, indicate that GANDA's initial conclusions regarding the relationship of FYLF habitat and flow were not correct (GANDA, 2004c), and that at current population levels habitat does not appear to be a limiting factor at higher flows. In 2006, 89 egg masses were laid at flows greater than 150 cfs; GANDA estimated flows were between 3,000 and 5,500 cfs when oviposition occurred (Plumas National Forest, in its September 29, 2006, draft EA comments). According to NPS, the median flows in May 2006 (5,703 cfs) and June 1-15, 2006 (1,671 cfs) were similar to pre-project flows.

Both the staff and agencies' flow regimes would more closely resemble the natural hydrograph with increasing peak flows through early spring and then a gradual step down to base flows through September, compared to the PG&E proposal. FYLF evolved with wet winters and dry summers, and their life cycle is adapted to these predictable, seasonal cycles of peak flow and base flow (Mount et al., 2006). Immobile FYLF egg masses and developing tadpoles and metamorphs with limited mobility are particularly vulnerable to changes in flow. As noted by NPS, low flows would always have the potential to be over-topped by spill events, turbine trips, or fluctuations caused by upstream projects. Increasing the flows during the breeding season would reduce the risk of affecting eggs masses from any flow perturbations. We expect the higher minimum flows identified by staff would provide more FYLF breeding and rearing habitat, and probably reduce the risk of egg mass desiccation and tadpole stranding, because higher minimum flows would reduce the difference between operational flow fluctuations and normal operating conditions.

The agencies' proposals would provide more FYLF breeding habitat than the staff flow regime, but may increase the physiological stress on tadpoles unless sufficient low flow refugia are provided by substrate (cobble, boulders) or emergent riparian vegetation. Research, in experimental conditions, has shown that tadpoles seeking refugia in the substrate over a period of time face energetic costs that slow growth and development (Mount et al., 2006). PG&E's proposed minimum flow would minimize energetic costs because there would be more plentiful refugia available, but less FYLF habitat is available for egg masses, tadpoles, and metamorphs at the proposed minimum flows than in either the agencies' or staff flow regimes.

In 2004 and 2005, the mean minimum daily temperatures in the river were between 10 and 16°C when FYLF egg masses were deposited. Although breeding took place on the declining limb of the hydrograph and was clustered below flow levels that did not exceed 55 percent above base flow (GANDA, 2006), at least six frogs bred when flows were more than 100 percent above base flow (2 on Poe reach; 4 on Cresta reach). In each case the daily flow was rapidly declining. These results lead GANDA (2006) to

conclude that the river water temperatures must meet a strict temperature threshold before frogs initiate breeding, and that the absolute flow level was not as important to the initiation of egg deposition as the location of the flow on the hydrograph. PG&E's proposed minimum flow of 150 cfs is similar to the current mean flow of 110 cfs during the FYLF reproductive season, so the mean water temperature would also be similar to current conditions. The staff-identified flow regime's changes in minimum flow would decrease water temperatures in the Poe reach slightly during the summer months to meet coldwater fisheries objectives, however flows would be within the range required to initiate FYLF breeding (10 to 16°C). For further information on the effects of minimum flows on water temperature see sections V.C.1, *Water Resources*, and V.C.2, *Aquatic Resources*.

Although cool temperatures are required for FYLF breeding, FYLF evolved in relatively low elevation systems with warm summer temperatures that facilitate the rapid maturation of young of the year. The cooler mainstem temperatures proposed by the agencies during the FYLF rearing period may slow development of FYLF eggs, tadpoles, and metamorphs to some unknown degree. Possible effects include increased risk of predation or displacement due to longer periods of immobility or low mobility.

Ramping Rates

PG&E's proposed and the agencies' and staff minimum flow recommendations would attempt to provide relatively stable flow regimes, including controlled up- and down-ramping rates to protect FYLF. Interior's proposal is for an up-ramp rate of 250 cfs/hour March 1 to July 1 and 400 cfs/hour the rest of the year. The staff's ramping rate would extend the 250 cfs/hour up-ramp rate from March 1 through September 30 to protect FYLF during the entire reproductive season. Interior and staff both recommended a 150 cfs/hour down-ramp rate throughout the year. NPS concurs with staff that stable flows during the breeding season are optimal, to avoid egg mass desiccation from decreasing flows (September 14, 2006, draft EA comments).

The Plumas National Forest, the Water Board, and NPS, in their comments on the draft EA, expressed concern that large, rapid fluctuations in flows due to Poe Project operations have had lethal effects on FYLF. The Water Board stated a ramping rate study and control measures would be reasonable and prudent in any future license to reduce the lethal effects on FYLF that were observed in June 2006. Agencies agreed in the November 2006 10(j) meeting that a ramping rate plan and schedule should be developed.

Our Analysis

A radio telemetry study in 2005 indicated that most adult frogs were able to withstand high flows and not get washed downstream or otherwise harmed during the breeding season; investigators found a single adult frog that was killed as a result of the

large fluctuations (GANDA, 2006). FYLF egg masses and tadpoles may be affected by flow fluctuations, however. Pulga gage hydrologic data taken at 15-minute intervals below the Poe dam shows large increases and decreases in flows when the dam is spilling and when project operations are in control of the flows, and in June 2006, 46 of 89 FYLF egg masses (52 percent) were desiccated when project flows rapidly decreased from 1,700 to 170 cfs (Plumas National Forest, September 29, 2006; Water Board, September 15, 2006; NPS, September 14, 2006, draft EA comments). Stable flows would also provide more optimal tadpole rearing habitat, and may provide more cover from terrestrial predators (Mount et al., 2006).

The agencies and staff agree that ramping rates involve complex operational issues with the Poe dam gates and the ability to control spills and ramping rates at the Rock Creek-Cresta dam (November 2006 10(j) meeting). Rock Creek-Cresta ramping rates are being tested as part of the new license and changes in the equipment at Rock Creek-Cresta may be needed to control ramping rates. The 5th year Rock Creek-Cresta ramping rate report is due in May 2007 and will be beneficial in developing the Poe project ramping rate plan, schedule, and monitoring requirements. It would be appropriate for PG&E to develop a ramping rate plan, schedule, and an effectiveness monitoring plan in consultation with the involved resource agencies, and file this plan with the Commission for approval, to provide timely protection for FYLF during the reproductive season.

During low summer base flow when spillage is rare, the Interior and staff recommended ramping rates would have a high probability of success in protecting FYLF. However, it is unlikely that PG&E can successfully implement either of the recommended up- and down-ramping rates during periods of spring and fall spillage until operational and equipment changes occur at Poe and Rock Creek-Cresta dams. Therefore, FYLF would continue to be adversely affected by uncontrolled spills during the spring breeding and fall rearing periods until the ramping rate control issues are resolved.

When controlled ramping rates can be successfully implemented, the staff-identified up-ramping rate of 250 cfs/hour March 1 to September 30 would minimize the potential for FYLF egg mass scouring and tadpole and juvenile stranding and displacement more effectively than the higher up-ramping rates proposed by Interior (400 cfs/hour) from July 1 through October 1 because egg masses, tadpoles, metamorphs, and juvenile frogs are still in the river during these months.

Monitoring

Interior and Cal Fish and Game recommend and the Forest Service specifies biological monitoring plans, including FYLF monitoring. Interior recommends that an instream flow monitoring plan be developed within 60 days of license issuance, to specify how PG&E would monitor the effects of the new instream flows on fish and wildlife, including the FYLF (10(j) recommendation no. 1c). The agencies agreed that a comprehensive report for all monitoring studies would be an appropriate requirement to

provide a better understanding of the project's effect on aquatic resources (November 2006 10(j) meeting). The agencies requested that project operational information be provided in any instream flow effects monitoring report.

The Poe reach Biological Monitoring Plan proposed by Interior and Cal Fish and Game would require PG&E to develop and submit for approval within 1 year of license issuance, a plan to implement annual fish, FYLF, and benthic macroinvertebrate monitoring in the Poe reach. The goal of instream flow monitoring would be to determine if fishes, FYLF, and benthic macroinvertebrates are benefiting from a new minimum flow regime. The Interior and Cal Fish and Game plan would require annual FYLF monitoring studies for the course of the new license, and should include the verification of suitable habitat, inventory of available habitat compared to actual habitat utilization, population health, reproductive success, and the distribution of FYLF. Fish and benthic macroinvertebrate monitoring are discussed in section V.C.2, *Aquatic Resources*. Comprehensive final and summary monitoring reports would be submitted to the agencies and the Commission annually.

Cal Fish and Game's 10(j) recommendation no. 7 also calls for monitoring biological changes due to changes in instream flow timing and magnitude, including the response of FYLF to changes in the flow timing and magnitude.

The Forest Service, in the November 2006 10(j) meeting, recommended annual FYLF monitoring for the term of the license and stated they will provide a very specific monitoring plan in a future 4(e) filing. The Forest Service monitoring plan will be limited to the known FYLF breeding locations that have been identified by previous surveys (GANDA 1999-2006), to be economically feasible. The Forest Service monitoring plan would include (1) evaluation of the adaptive responses of FYLF to the timing and magnitude of minimum instream flows, ramping rates, scheduled pulse flows, other operational flows, whitewater recreation pulse flows, and unscheduled spills; (2) verification of suitable FYLF habitat, (3) inventory of available habitat compared to what habitat is actually used; and (4) monitoring of population health, reproductive success, and distribution of all life stages. The results of this monitoring would be submitted to the consulting agencies in draft form by January of the year following completion. The report would be finalized by the following June and would compare the results with those of previous surveys. At the conclusion of the monitoring cycle, the results of the monitoring efforts would be reviewed by PG&E and the resource agencies. If, after review, it is determined that FYLF would benefit from changes in the instream minimum flow regime, the agencies and PG&E would evaluate and determine what, if any, changes would need to be made.

PG&E, in response to the recommendations for FYLF monitoring by the resource agencies, requests that a FYLF monitoring plan be developed separately from the other resources in the agency-recommended biological monitoring plans. PG&E, in its September 13, 2006, draft EA comments, states there would be little benefit to initiating

monitoring in the first 2 years of the license, and that bi-annual monitoring in years 3 through 15 would provide adequate information to evaluate the response of FYLF to the new flow regime.

Our Analysis

The Plumas National Forest, in its September 29, 2006, draft EA comments, indicates that the effects of the proposed minimum flows, decreased water temperature, and ramping rates on all life history stages of FYLF, specifically tadpoles, are unknown. Therefore, monitoring the response of all life stages of FYLF in the Poe reach population over time would be necessary to evaluate potential effects of the proposed minimum flow changes, along with effective adaptive management changes, as needed. If the FYLF population is negatively affected by changes in flows and ramping rates specified in a new license and subsequent temperature changes, then annual monitoring could identify these factors and could provide a timely adaptive mechanism(s) to benefit FYLF. Therefore, PG&E, the agencies, and staff all concur that a separate FYLF monitoring plan be developed and implemented to enable PG&E to focus on the needs of the FYLF, without being tied to the timing of other survey efforts. The new minimum flow regimes, FYLF reproductive biology, natural hydrologic cycles, and project operations all need to be considered to develop and implement an effective monitoring program.

PG&E, in its September 13, 2006, draft EA comments based its FYLF biannual monitoring proposal for license years 3 through 15 on researchers' observations that the effects on a particular year class of FYLF are not observed until the fourth year, when the frogs reach reproductive maturity (memo to the Ecological Resources Committee, dated July 13, 2006; A. Lind, Forest Service Sierra Nevada Research Center herpetologist, September 12, 2006, letter attached to Plumas National Forest September 29, 2006, draft EA comments; Mount et al., 2006). The proposed PG&E monitoring schedule would not be sufficient to evaluate all the factors including natural conditions, the proposed variations in flow regimes based on water year type, and the wide range of operational conditions that affect individual year class success and long-term population trends.

The staff and agencies' short-term monitoring proposals are for annual surveys during the first 5 years of license issuance to capture the direct effects of the new minimum flow regime on FYLF; however, it is unknown whether controlled ramping rates could be achieved during this time. Therefore, it may be appropriate to continue the annual FYLF monitoring until the target ramping rates for flows less than 3,000 cfs can be effectively controlled during the FYLF reproductive season.

Interior and Forest Service discussed annual FYLF monitoring for the term of the license during the November 2006 10(j) meeting. Long-term, annual monitoring would allow PG&E to provide more rapid adaptive management responses to changing annual conditions than bi-annual monitoring, and may also provide large enough sample sizes to

be statistically significant, over the range of wet, dry, and critically dry water years during the license period. However, long-term, bi-annual monitoring would also identify trends and factors affecting FYLF populations, allow for adaptive management, and would be more cost effective.

As specified by the Forest Service, PG&E and the agencies would review the results of the monitoring efforts and recommend adaptive management changes in the minimum flow regime and ramping rates if they would benefit FYLF. If there are ongoing FYLF monitoring efforts at upstream projects (Rock Creek-Cresta and UNFFR), coordinating the monitoring efforts and annual reports would significantly improve the ability to identify important population trends, project-related cumulative effects, and naturally occurring versus project-related limiting factors in the NFFR.

Pulse Flows

PG&E did not propose any pulse flow releases due to the potential for adverse effects on the FYLF. Interior recommends, in its 10(j) recommendation no. 1b, and Forest Service specifies, in its preliminary 4(e) condition no. 24(2), that PG&E implement a pulse flow. The agencies specify or recommend that if on February 10, in dry and critically dry years, a natural or PG&E-generated instream flow of at least 2,000 cfs (for a minimum 12-hour duration) has not occurred through the Poe reach within the previous 18 months, then PG&E should provide a pulse flow event that includes a 2,000-cfs flow for 12 hours prior to March 1 of that year. Interior recommends a 12-hour pulse flow plus ramping rates that would total approximately 29 hours, at an up-ramp rate of 400 cfs/hour and down-ramp rate of 150-cfs hour (November 2006 10(j) meeting).

The agencies' pulse flow would only be scheduled if the following additional conditions are met: (1) the mean daily water temperature on two successive days in the Poe reach, at gage NF23, is less than or equal to 10°C , and (2) rainbow trout are not observed to be spawning in the Poe reach as reported by PG&E to Cal Fish and Game or the Forest Service. The duration of the pulse flow would include up and down ramping periods, at the basic ramping rate stated in 10(j) recommendation no. 3. If monitoring of the pulse flow indicates that accumulated organic and fine-grained sediment is not being adequately removed, then PG&E would modify the magnitude or duration in consultation with FWS, Forest Service, NMFS, the Water Board, and Cal Fish and Game. Butte County, in its April 11, 2005, letter, concurs with the Forest Service pulse flow conditions.

Cal Fish and Game makes a similar recommendation in its April 8, 2005, 10(j) recommendation no. 2; however, it recommends the duration of the pulse flow event be three days (72 hours), including up- and down-ramping. Additionally, Cal Fish and Game's recommendation calls for pulse flows to be released prior to April 1.

Our Analysis

Typically, flows in the bypassed reach greater than 2,000 cfs occur during winter or spring high flow events. Over a 24-year flow record at the Pulga gage used for table 21, all water years except six had mean daily flows greater than 2,000 cfs during mid-January to mid-March. During the period of 1968-2005 listed in table 4, 30 out of 38 years had mean daily flows in excess of 2,000 cfs during mid-January to mid-March. However, in dry or critically dry years, it is possible that there could be successive years where flows greater than 2,000 cfs do not occur naturally, which could result in lower aquatic habitat quality (particularly for trout spawning) due to the occurrence of fines and detritus in the gravels. In the 1968-2005 period, 1977 was the only year which failed to have a mean daily flow in excess of 2,000 cfs following a year which also did not have a mean daily flow in excess of 2,000 cfs.

The November 2006 10(j) meeting participants agreed that the objectives of the pulse flows would be to clean and maintain trout spawning gravel by mobilizing and moving fine grained sediment that may settle during periods of low water, but not to move larger, coarse gravel. These flows would be within the range of natural conditions, and no adverse effects to FYLF habitat are expected, with possible minor beneficial effects. For additional discussion of pulse flows on substrate and fish habitat, see sections V.C.1, *Water Resources* and V.C.2, *Aquatic Resources*.

Cal Fish and Game maintains that a 72-hour pulse flow would be appropriate, but there is no information in the record to indicate that a 72-hour flow event would necessarily be better at cleaning debris and fine sediment from the reach than a shorter duration event. We find, however, that there appears to be some basis for maintaining a pulse flow for more than 12 hours (see section V.C.2, *Aquatic Resources*).

FYLF breeding in the project area is typically initiated around mid-April in dry and critically dry years, and from late-April to mid-May in normal years but may occur as early as late March and as late as early July (GANDA, 2004a; 2004b; 2006). High flows (velocities greater than or equal to 20 centimeters/second [0.7 fps]) have been shown to scour egg masses from their substrate (GANDA, 2003; Kupferberg, 1996, as cited in GANDA, 2003). The staff recommendation to schedule pulse flows before March 1 (well before the start of FYLF breeding), would avoid FYLF breeding times and avoid loss of egg masses. Thus, scheduled pulse flows as recommended by staff and Interior, and specified by the Forest Service would have no effect on FYLF.

Whitewater Recreation Flow Releases

PG&E does not propose any flow releases for whitewater boating.

American Whitewater, Chico Paddleheads, and Shasta Paddlers (Boating Groups) (letter dated April 11, 2005, from D. Steindorf, California Stewardship Director,

American Whitewater Affiliation, Paradise, CA, to M.R. Salas, Secretary, FERC, Washington, DC) initially recommended slow down-ramping from spring spills, and recreational flow releases from Poe dam one weekend each month from June to October. These releases would be between 800 and 1,300 cfs. Further descriptions of these flows are discussed in section V.C.5, *Recreational Resources*.

Butte County and American Whitewater, in their September 18, 2006, draft EA comments, proposed a continuation of a natural springtime spill and recreational pulse flows only from July to October. Natural Heritage Institute on behalf of Butte County, in its September 19, 2006, amendment to Butte County's September 18, 2006, includes a revised proposed whitewater flow schedule: (1) flow releases one weekend per month, July through October; (2) a test period of flow releases greater than or equal to 600 cfs and volume of 4,000 acre-feet per year including ramping, the length of test period to be determined by the Forest Service; (3) site-specific studies to monitor and assess impacts to FYLF tadpoles resulting from this schedule and project flow fluctuations, with study protocols to be developed by the resource agencies in consultation with PG&E, Butte County, and American Whitewater to determine the acceptability of these initial flow levels for whitewater recreation; and (4) the proposed flow schedule may be amended by agreement between the resource agencies, Butte County, and American Whitewater, and any necessary license amendment.

Victor Simenc, an individual stakeholder, in his September 2006, draft EA comment letter, recommends increased base flows to help frogs, fish, and still allow a reduced but partial boating experience, or an extension of up-ramp and down-ramp rates to allow frogs at various [developmental] stages more time to adjust.

PG&E, in its May 23, 2005, response to the agencies' comments, terms, and conditions, recommends that whitewater recreation flows not be released from mid-April to late-August in to avoid direct effects on FYLF egg masses and tadpoles. PG&E also states that the Water Board's section 401 WQC would give consideration to the various beneficial uses and determine how to reasonably protect them, and notes that not all beneficial uses can or must be satisfied when there are conflicts between them. PG&E points out that harming FYLF in order to provide recreational flows that do not currently exist would violate State Water Board Resolution No. 68-16 by unreasonably affecting present and anticipated beneficial uses. PG&E also points out that the Basin Plan recognizes that the NFFR provides the beneficial use of canoeing and rafting when the appropriate flows are present, but does not dictate that recreational flows must be provided there.

PG&E further states that summer recreation flows in the Poe bypassed reach would not protect, enhance, or restore conditions for FYLF. PG&E points out that recreation flows in June, July, and August could dislodge, damage, or scour FYLF egg masses, displace tadpoles, and unduly harm and impede developing FYLF. In wetter water years when FYLF breeding is delayed, recreation flows in early September could

negatively affect tadpoles still present in the Poe bypassed reach. Other indirect effects to FYLF include reduction and/or scouring of algae and detritus, which are important food and cover habitat components.

PG&E also reports that the results of studies from 2001 to 2003 in the Poe bypassed reach indicate that the FYLF breeding season extends from early April through early July, which includes the period of time that egg masses are present in the river from deposition to complete hatching. PG&E points out that egg masses are vulnerable to changes in flow levels and implementation of pulse flows for recreation, temperature moderation, or stream maintenance would negatively affect FYLF if these flows occur while egg masses are present. PG&E also states that the potential for stranding FYLF tadpoles would increase substantially if streamflows fluctuate in May through August when tadpoles are present in the Poe reach. For these reasons, PG&E recommends that recreation flows not occur in mid-April to late-August.

PG&E, in its September 13, 2006, comments on the draft EA, provides information from Dr. Sarah Kupferberg, co-author of *Pulsed Flow Effects on Foothill Yellow-legged Frog (Rana boylei): Integration of Empirical Experimental and Hydrodynamic Modeling Approaches* (Mount et al., 2006), which it says supports its proposal not to provide flow releases for whitewater recreation due to the negative impacts on the FYLF population. Dr. Kupferberg's comments were based on observed population declines on the upstream Cresta reach relative to the Poe reach that appear to be based on 2002 and 2003 recreational flow releases on the Cresta reach. Dr. Kupferberg stated (as cited in PG&E's comment letter) that it was premature to conclude that there were no significant adverse effects from recreational flows on the biological community in general, and that there was evidence of negative effects specifically on the FYLF population.

Dr. A. Lind, Forest Service Sierra Nevada Research Center herpetologist, and another co-author of Mount et al. (2006) concludes that data available to date indicate that the adult FYLF breeding population and number of egg masses on the upstream Cresta reach have declined to very low levels over the last 2 years; comparisons of the FYLF population on the Poe reach indicate that recreational flows are likely a factor in this decline; and there is evidence of effects of pulsed flows on tadpoles and young-of-the-year/juvenile frogs. Dr. Lind also states that about half of the egg masses on both the Poe and Cresta reaches were stranded or otherwise compromised in 2006 as a result of project operations and dropping water levels (A. Lind, Forest Service Sierra Nevada Research Center herpetologist, September 12, 2006, letter attached to Plumas National Forest, September 29, 2006, draft EA comments).

Our Analysis

Stable flows during the breeding season are optimal, to avoid egg mass desiccation from decreasing flows, egg mass scouring from increasing flows, and tadpole stranding

from flows receding and draining from isolated pools. According to studies conducted in the Poe reach from 2001 to 2003, FYLF egg masses have been observed as early as April 10th and as late as July 5, and tadpoles are estimated to be present from June 1 until October 5; however, the majority of tadpoles appear to be gone by early-September (GANDA, 2004b). In 2004, 20 adult males and 2 adult female frogs were observed at Poe reach breeding sites in late March and early April prior to the survey start date of April 7 (GANDA, 2006).

Scouring of FYLF egg masses has been documented during high flow releases or uncontrolled spill from dams at this project (GANDA, 2004b; Mount et al., 2006; the Water Board, September 15, 2006, draft EA comments; Plumas National Forest, September 29, 2006, draft EA comments; NPS, September 14, 2006, draft EA comments), upstream at the Rock Creek-Cresta Project (GANDA, 2004d), and at the nearby Pit 3, 4, 5 Project (Spring Rivers, 2003; letter dated May 23, 2005, from T. Jereb, Relicensing Senior Project Manager, PG&E, San Francisco, CA, to M.R. Salas, Secretary, FERC, Washington, DC).

On the Pit River, a study showed that longer duration spring flows of a higher magnitude were more damaging to FYLF egg masses than flows of shorter duration and higher magnitude, and older egg masses became more susceptible to partial or complete scouring (Spring Rivers, 2003; letter dated May 23, 2005, from T. Jereb, Relicensing Senior Project Manager, PG&E, San Francisco, CA, to M.R. Salas, Secretary, FERC, Washington, DC). Prolonging the spring spills, as recommended by Boating Groups and Butte County would have to be timed so that the spills occur prior to FYLF breeding to prevent egg mass scouring.

Most of the NFFR FYLF egg masses are deposited on the declining limb of the hydrograph (GANDA, 2006). This is a natural adaptation to California river systems that experienced predictable cycles of high spring run-off followed by low summer base flows prior to hydropower developments (Mount et al., 2006). Therefore, uncontrollable and untimely whitewater recreation pulse flows may initiate FYLF egg deposition or site selection that may result in desiccation when the flows recede, or detachment of existing egg masses.

The 2004 FYLF studies included an assessment of isolated pool areas remaining at FYLF sites after 800, 1,200, and 2,000 cfs flow releases (GANDA, 2004c). The 2004 isolated pool study determined that the area of isolated pools increased in size with each larger flow release (table 29). Due primarily to differences in site gradient, sites 2, 4, and 6 had the most isolated pool area. Site 4, near the confluence of Flea Valley Creek and Poe reach, is the most productive FYLF breeding site.

Table 29. Isolated pool area (square meters) by site following the 800, 1,200, and 2,000 cfs flow releases. (Source: GANDA, 2004c)

Flow Level (cfs)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Post 800	0	160	1	159	2	67
Post 1,200	11	201	1	207	6	123
Post 2,000	15	242	1	246	6	247

Isolated pools that remain after high flow events could be the source of FYLF tadpole mortality because tadpoles get stranded in these pools as water recedes (T. Jereb, letter dated May 23, 2005). Tadpole stranding was observed following recreation flows in the Cresta reach of the NFFR (GANDA, 2004d; 2004e), and following pulse flows at the North Fork Mokelumne River (Jones and Stokes, 2004; Ibis Environmental, 2005, as cited by T. Jereb, Relicensing Senior Project Manager, PG&E, San Francisco, CA, to M.R. Salas, Secretary, FERC, Washington, DC). However, no field studies have been conducted to document the amount of actual tadpole stranding that occurs in the Poe reach due to pulse flow releases.

Preliminary research in experimental conditions indicates that the critical velocity that tadpoles are flushed out of the substrate is probably between 20 to 40 centimeters/second (Mount et al., 2006). During the experiments, less than 50 percent of the tadpoles that were flushed into higher velocity habitat (10 to 15 centimeters/second) were able to find low flow refugia in the substrate or swim cross-current to lower velocity areas. Tadpoles that have been flushed out of the substrate or stranded in isolated pools are at higher risk of predation from aquatic and terrestrial predators, as well as desiccation as isolated pools recede. Larger/late developmental stage tadpoles appear less able to withstand increasing water velocities than mid-developmental stage tadpoles, and late summer pulse flows may have greater negative effects than previously expected (A. Lind, Forest Service Sierra Nevada Research Center herpetologist, September 12, 2006, letter attached to Plumas National Forest September 29, 2006, draft EA comments).

Effects of Flows on Riparian Habitat

Some riparian vegetation in the project area would likely be inundated either temporarily or permanently with increased instream flows, pulse flows, or whitewater releases. It is important to maintain healthy riparian vegetation because it provides erosion control as well as vital habitat to a variety of wildlife species.

PG&E initially proposed to monitor the responses of riparian vegetation to any new flow regime that may be implemented. PG&E, in its September 13, 2006, comments on the draft EA states, however, that there is no need for a riparian monitoring program, and that none of the resource agencies have recommended such a program. It further notes that annual monitoring immediately following the onset of increased flows allows

insufficient vegetative response time and would yield little useful information. Other FERC projects have implemented similar monitoring programs, but at 5-year intervals following an initial baseline habitat assessment. PG&E also states that the long-term monitoring project that it is funding within the Feather River watershed, including at the Rock Creek-Cresta Project, would provide the type of information desired by staff and the agencies, and would negate the need for a similar study in the Poe reach.

PG&E also states that there would be a minimal increase in water surface elevation (less than 1 foot) between current flow levels and the staff-recommended flows, and it is unlikely there would be any measurable effect on riparian habitat. PG&E also believes that storm and flooding events contribute to vegetation loss and is not solely an effect of project operations.

Although the Forest Service provided no specific conditions regarding riparian vegetation, keeping plant communities in riparian areas and wetlands diverse and healthy is one of their desired aquatic and terrestrial resource conditions. Additionally, maintaining watershed connectivity for riparian species, and maintaining and restoring instream flows sufficient to sustain desired conditions in riparian and wetland habitats are two of the goals of the Sierra National Forest Plan Amendments (letter dated April 6, 2005, from J.S. Rider, Forest Service, Attorney, Pacific Region, San Francisco, CA, to M.R. Salas, Secretary, FERC, Washington, DC).

Our Analysis

Under the existing flow regime (50-cfs minimum flow, as measured at the Pulga gage, typically resulting in a flow of about 110 cfs through the reach due to leakage at Poe dam) and tributary accretion, there are approximately 623,732 square meters (154 acres) of riparian cover, including bare ground, or 333,298 square meters (82 acres) not including bare ground. The moderately high flows associated with the staff and agencies' proposed pulse flows (2,000 cfs) would be of short duration and within the range of natural, winter flow conditions. As shown in table 25, riparian habitat is inundated during high-flow conditions (1,400 cfs), resulting in flooding of approximately 14 percent of the riparian vegetation currently present at low-flow conditions. The occasional pulse flows would only occur during dry and critically dry years when flows of this magnitude have not naturally occurred within the previous 18 months. Therefore, the pulse flows would benefit riparian vegetation by creating floodplain flooding, scour, and deposition during the winter months when the plants are dormant, in years when these processes would not occur naturally.

Although the riparian mapping study conducted by PG&E in 2000 showed that some riparian vegetation would be inundated during high flow releases, it does not identify the effects long-term increases in flows, such as the minimum flows recommended by the resource agencies or identified by staff, would have on riparian vegetation. It would be expected that although some current vegetation could be

seasonally inundated and lost, other riparian habitat would be created from a conversion of upland or unvegetated areas to riparian vegetation due to inundation or a rise in the water table. A loss of riparian habitat could adversely affect amphibians, reptiles, songbirds, small mammals, and aquatic furbearers that depend on riparian plant communities for forage, hiding, nesting, or denning. A loss of riparian vegetation could also reduce bank stability and increase the risk of establishment and threat of noxious weed populations on exposed soils. Riparian vegetation established as a result of the new higher flows would ultimately replace these functions and values. Additionally, recreation facility enhancements, as described in section V.C.5, *Recreational Resources*, could result in the loss of some vegetation, both due to construction and also increased human disturbance in riparian zones.

Overall, the minimum flow regime recommended by the resource agencies or identified by staff would more closely mimic the natural hydrograph than the continuous 150-cfs minimum flow proposed by PG&E, and the long-term benefits of increased flows on riparian vegetation are expected to exceed any short-term losses. PG&E's analysis of the effects of a 1,400-cfs flow on riparian vegetation was the only quantifiable information available for this analysis, and does not provide estimates of potential effects on riparian vegetation associated with (1) long-term increases in flow associated with the staff or agency minimum flow proposals; (2) pulse flows; and (3) whitewater recreation flow releases, if any. Additionally, although the Poe reach may be somewhat similar to the Rock Creek-Cresta reach, the flow regime that would be required in the Poe reach would not be identical to that in the Rock Creek-Cresta reach, and the response of riparian vegetation to the new flow regime may not be the same as seen at upstream reaches. Because the effects of a new minimum flow regime, pulse flows, recreational flows (if implemented), and enhanced recreational facilities on riparian vegetation can not be predicted with certainty, a riparian monitoring plan would indicate whether sufficient re-establishment of riparian vegetation occurs to support aquatic and wildlife communities, and would identify any need for protective measures.

Project Effects on Special Status Species

Several rare plant species and a few special status wildlife species are either known to occur or have the potential to occur in the project area. Changes in project operations and increased recreational use have the potential to affect special status plant and wildlife species that occur in the project area.

PG&E proposes to conduct surveys and develop protection and/or mitigation plans for special status plant and wildlife species, in coordination with interested resource agencies, in the event that any future project-related activities might affect the habitat of any special status species. They also propose to manage existing recreation, with the protection of special-status plant species as a secondary objective. Recreation management is discussed in section V.C.5, *Recreational Resources*.

The Forest Service, in its September 26, 2006, final 4(e) conditions, specifies (condition no. 35) an annual review of the current list of special status species (federally listed, Forest Service Sensitive, or Plumas National Forest watch list) to determine if any new species have been added to the lists. If a species is added, the Forest Service, in consultation with PG&E, would determine if that species or its unsurveyed habitat is likely to occur on NFS lands within the project boundary that are affected by project operations. If it is likely to occur, PG&E would develop and implement a study plan, in consultation with the Forest Service, to reasonably assess the effects of the project on the species. PG&E would prepare a report on the study, including objectives, methods, results, recommended resource measures where appropriate, and a schedule for implementation and file it with the Forest Service for review and approval. PG&E would also file the report with the Commission and implement any measures required by the Commission.

Additionally, in preliminary 4(e) condition no. 36, Forest Service specifies that before construction of any new project features on Forest Service lands (including recreation developments) that may affect a species proposed for listing, or listed as federally threatened or endangered, or other special status species or their habitats, that PG&E prepare, in consultation with the appropriate resource agencies, a biological evaluation of the potential effects of the action on the species or its habitat. This report would be submitted to the Forest Service for approval which may, in consultation with the Commission, require mitigation measures for the protection of the affected species. Unless determined to be unnecessary by the Forest Service, prior to any ground-disturbing activities, PG&E would perform surveys, in the area to be disturbed, for species where current information on population occurrence is lacking, such as the valley elderberry longhorn beetle (VELB), terrestrial mollusks, and the Pacific fisher.

PG&E, on December 19, 2005, filed alternative 4(e) condition no. 35, as part of its filing to the Forest Service proposing alternative 4(e) conditions, pursuant to the Energy Policy Act of 2005. In the alternative condition, it limits the extent of the review and potential surveys to National Forest System (NFS) lands within the project boundary, as opposed to all lands within the project boundary. PG&E states that this alternative condition would appropriately limit the scope of the conditions to activities and facilities on Forest Service lands within the project boundary. PG&E, however, by letter dated September 29, 2006, notified the Commission that, as a result of the settlement discussions and agreement reached on final section 4(e) conditions with the Forest Service, it was withdrawing its alternative section 4(e) conditions.

Our Analysis

Several special status plant and wildlife species could occur within the project area. Rare plant surveys identified 48 occurrences of twelve special status plant species (see table 24). None are federally or state listed as threatened, endangered, or candidate

species. Several of the rare plant species located during surveys are threatened by maintenance activities and noxious weeds.

Species-specific rare wildlife surveys did not locate any occurrences of rare wildlife, with the exception of the FYLF (discussed above), one adult peregrine falcon flying down the canyon, and a lone adult western pond turtle on the NFFR. Based on these surveys, it appears unlikely that there is currently any breeding or nesting habitat in the project area for peregrine falcons, northern goshawks, willow flycatcher, or western pond turtles. These wildlife surveys were not conclusive, however, on the population status of wildlife species that were not surveyed, and those for whom the surveys were inconclusive, such as the river otter and Pacific fisher.

Special status plants and wildlife have the potential to be affected by changes in project operations and new recreational developments. Increases in minimum instream flows, instituting pulse flows, and recreational releases that could be a part of any new license, have the potential to alter riparian habitat, as discussed above. Additionally, construction of new recreational facilities, and the resultant increase in human use, could affect rare species habitat or alter the use patterns of rare wildlife. If ground disturbing activities occur, noxious weeds could also spread into these areas, further jeopardizing rare plant populations.

As discussed in our analysis concerning riparian vegetation, it is expected that the return to a more natural hydrograph and an increase in minimum instream flows would ultimately result in beneficial changes to most rare species' habitats. It is unknown, however, exactly how the riparian vegetation, and associated plants and wildlife, would respond to the changes in flows. As such, a monitoring program, as proposed by PG&E and specified by the Forest Service would ensure that changes in project operations would not adversely affect special status plant and wildlife species. Forest Service final 4(e) condition no. 35 would require PG&E to annually review the special status plant and wildlife list and develop and implement a study plan and report to determine potential effects of the project on any species likely to occur within NFS lands affected by project operations. Under this condition, PG&E would also have to develop and implement resource management measures. Although condition no. 35 calls for PG&E to consult with the Forest Service to determine which species need to be studied, including FWS and Cal Fish and Game in the consultation process would ensure all species would be considered throughout the project boundary. Expanding the surveys beyond the scope identified in the final 4(e) condition to include all lands within the project boundary, not just NFS lands, would provide the same level of monitoring and protection for special status species throughout the project area, on lands under Commission jurisdiction.

Forest Service preliminary 4(e) condition no. 36 requires surveys for certain special status species prior to ground-disturbing activities, an assessment of the action's potential effect on species or their habitat that occur in the location of the ground disturbance, and mitigation measures for the protection of the affected species. This

would ensure that special status species would not be adversely affected by new project-related construction.

Project Effects on Noxious Weeds

Surveys conducted by PG&E located five noxious weed species in the project area. Noxious weeds can take over areas of native vegetation, threatening rare plant species. Project-related disturbance from recreation creates conditions that are favorable to the spread of noxious weeds.

PG&E proposes to implement a noxious weed control program on project land, although they do not provide a specific plan.

Forest Service final 4(e) condition no. 37 (letter dated September 26, 2006) specifies that PG&E file with the Commission, within 2 years of license issuance, an invasive weed management plan, developed in consultation with the Forest Service, the county agricultural commissioner, and CDFR. The purpose of this plan would be to address both aquatic and terrestrial invasive weeds within the project boundary and adjacent to project features directly affecting NFS lands including roads, and distribution and transmission lines. According to the Forest Service, the invasive weed management plan should include and address the following elements: (1) an inventory and mapping of any new populations of invasive weeds using a Forest Service compatible database and GIS software; (2) actions and strategies for prevention and to control the spread of known populations or introductions of new populations, such as vehicle/equipment wash stations; (3) a schedule for the control of all A, B, Q and selected other rated invasive weeds, designated by the resource agencies;⁹ (4) on-going annual monitoring of known populations of invasive weeds for the life of the license in locations tied to project actions or effects, such as road maintenance, at project facilities, O&M activities, new construction sites, etc. to evaluate the effectiveness of re-vegetation and invasive weed control measures; (5) actions to control new infestation of A and B rated weeds within 12 months of detection, or as soon as practical and feasible; (6) an adaptive management element to implement methods for prevention of aquatic weeds, such as public education and boat signage, an aquatic plant management plan, and boat cleaning stations at boat ramps for aquatic weed removal; (7) treatment of all classes of invasive weeds at specific sites where other objectives need to be met; (8) provision of monitoring information in database and GIS formats to the Forest Service annually; (9) restoration and revegetation of areas where treatment has eliminated invasive weeds; and, (10) monitor project-induced ground disturbing activities annually for the first three years after disturbance for new populations of noxious weeds.

⁹A-rated weeds are targeted for eradication or containment. B-rated weeds are more widespread and difficult to contain. C-rated are the most widespread, and control efforts are not ordinarily undertaken except in nurseries or seed lots.

Our Analysis

Surveys in the project area located 36 occurrences of five noxious weed species. Of these, none are considered to be A-rated based upon the system adopted by the California Exotic Pest Council (CEPC). One species, barbed goatgrass, is a B-rated weed. Yellow star-thistle, Klamathweed, and bouncing-bet are all C-rated. Himalayan blackberry, although not listed by CDFA as noxious, is widely accepted as an invasive exotic plant. It has been known to take over habitats and reduce native plant populations. Currently, several populations of rare plants in the project area are threatened by the spread of noxious weeds.

The Forest Service final 4(e) condition no. 37 indicates that the primary purpose of the invasive weed management plan would be to address the project-related spread of aquatic and terrestrial noxious weeds on NFS lands that may be related to project activities. As part of an invasive weed management plan, it is important to establish which populations are the result of project activities and which are a priority for control.

Implementation of a noxious weed management plan for the entire project, as opposed to just NFS lands, would help maintain native plant diversity and habitat quality and comply with federal and state laws. PG&E has completed weed inventories that identify problem sites and species; determining which project-related activities may be causing establishment or spread of these species would be a logical next step in development of the plans.

Attempts to eradicate population units that are already well-established and close to other population units, such as yellow star thistle and bouncing bet would not likely succeed, except at unacceptably high cost to other resource values. For these population units, reduction, containment, or control may be more realistic goals, which would not adversely affect surrounding resources. Therefore, the final 4(e) condition specified by the Forest Service to attempt to control A, B, and Q rated species is a reasonable goal. Similarly, while control within 12 months of detection is a desirable goal, the Forest Service recognizes that it is likely that there may be instances when this goal is unattainable.

We analyze the costs of measures proposed or recommended for terrestrial resources in section VI, *Developmental Analysis*, and make our final recommendations in section VII, *Comprehensive Development and Recommended Alternative*.

c. Cumulative Effects:

Significant sections of the NFFR are naturally confined to a river canyon within the project area. The railroad and highway corridors that follow both sides of the NFFR in the project area further confine the river, decrease the area of floodplain and riparian vegetation, and contribute fill material to the channel during floods (e.g., the 1997 flood).

As a result, the channel is unable to fully utilize its historical floodplain to dissipate peak flow forces. Erman (1986) and Erman et al. (1988) found that channel confinement/entrenchment in Sierra Nevada streams not only increased shear forces, bedload scour, and sediment transport during high flows and floods, but killed sculpin (a benthic fish species) and destroyed brook trout eggs that were buried in the substrate. From these results, it can be extrapolated that all stages of FYLF are adversely impacted by the increased shear forces, bedload scour, and sediment transport caused by the railroad and highway corridors when large pulse flows occur during the reproductive season. Because adult frogs and tadpoles normally use spaces in the cobble substrate to withstand high flows, and immobile egg masses would be fully subjected to these forces.

d. Unavoidable Adverse Effects:

None.

4. Threatened and Endangered Species

a. Affected Environment:

Valley Elderberry Longhorn Beetle

The VELB is federally listed under the ESA as threatened. The range of the VELB extends throughout California's Central Valley and associated foothills from generally below the 3,000-foot elevation contour on the east to the watershed boundary of the Central Valley on the west. All recent Butte County VELB records were from sites in the Central Valley below 300 feet in elevation. The beetle relies entirely on its host plant, the elderberry (*Sambucus* spp.). Elderberry shrubs are a common component of riparian forests in the Central Valley, and optimal habitat is usually considered moist valley oak woodlands or hardwood stands with a variety of species, such as cottonwood, sycamore, Oregon ash, or willow. The VELB is a wood-boring insect and lays its eggs in the stems of elderberry shrubs that are at least 1 inch in diameter at ground level. Frequently, there is no sign of the VELB except for the exit holes that the larvae create as they emerge just prior to the pupa stage. For this reason, surveys for the VELB focus on searching for elderberry shrubs.

In the spring and summer of 2000, surveys were conducted in the project area for the presence of elderberry in the riparian zone from Poe powerhouse to Poe dam. No elderberry plants were found growing in the project area. One small elderberry bush was found along Bardee's Bar Road in a moist, shaded draw; however, this plant was too small to host VELB.

California Red-legged Frog

The California red-legged frog (CRLF) is federally listed as threatened. On November 3, 2005, FWS designated critical habitat for this species. Neither the NFFR, nor its tributaries, were designated as critical habitat for the CRLF.

Historically, CRLF populations were found at the western slope of the Sierra Nevada Mountains at elevations below 4,900 feet. The current range is greatly reduced, with a few highly restricted populations in the Sierra Nevada, and most remaining populations occurring along the coast from Marin County to Ventura County. The primary constituent elements of CRLF habitat include essential aquatic habitat, associated uplands, and dispersal habitat connecting essential aquatic habitat (FWS, 2001). Breeding sites are varied, including marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds (FWS, 2001). Dense, shrubby, or emergent riparian vegetation closely associated with deep (more than 2.3 feet), still or slow-moving water is needed during the November to March breeding season, for attachment of egg masses and escape cover (Hayes and Jennings, 1988). Rocks, boulders, small mammal burrows, organic litter such as downed trees or logs, and leaf litter within 300 feet of riparian areas provide estivation habitat and refugia at any time of the year (FWS, 1996). The nearest known occurrence of CRLF to the project area is in the headwaters of a small creek, approximately 3.5 miles east of Poe powerhouse (Cal Fish and Game, 2003, as cited in the license application).

As part of the relicensing of the Rock Creek-Cresta Project, a habitat assessment and field surveys for CRLF were conducted in 1998, using FWS protocols, along the NFFR, including the Poe Project area. During the habitat assessments, areas of potential habitat for CRLF were mapped, photographed, described, and evaluated for suitability. Because of the generally steep topography in the project reach of the NFFR, the only suitable habitat along the NFFR occurs at off-channel sites where ponds or pools have formed as a result of ground disturbances caused by mining, road building, and other activities. None of the five sites characterized as having potentially high breeding value were within the project boundary (EA Engineering and Ibis, 1998a). Additionally, no CRLF were found during the protocol-level surveys (EA Engineering and Ibis, 1998b). Additional amphibian surveys, including for CRLF, were conducted in June 2000 in the project area. No CRLF were found during these surveys. No additional sightings of CRLF were documented during other relicensing studies conducted in the project area during the 1999 to 2000 study period.

Bald Eagle

There is one nesting pair of federally threatened bald eagles in the project area. This bald eagle territory has been consistently successful and productive with average

young/occupied year from 1970 to 2003 of 1.33 (table 30). The most recent active nest location is in a large, 180-foot-tall ponderosa pine located across the NFFR from the Poe powerhouse, about 490 feet upslope from the river adjacent to a transmission line tower. The two alternate nest trees are also large ponderosa pines, located further upslope from the current nest tree. All are surrounded by a multi-layered canopy of mostly sapling and pole-sized California bay tree, tanbark oak, big-leaf maple, Douglas fir, and California black oak, with a few scattered larger ponderosa pines and Douglas firs. A wildfire in November 2001 destroyed much of the timber stands near the nest territory; however, the area immediately surrounding and including the nest tree survived and continued to be used by the pair in 2002 and 2003.

The foraging home range for the bald eagles nesting at this location includes several miles of the NFFR upstream of Poe powerhouse, portions of the NFFR Arm of Lake Oroville, and most likely the West Branch Arm of Lake Oroville. During studies conducted in 2000, the majority of the foraging flights during the early nesting period (March-May) were to Lake Oroville (more than 65 percent). During the latter portion of the nesting season (June-August), when Lake Oroville water levels begin to recede, the use of Lake Oroville decreased to approximately 41 percent, with most of these trips to the upper portion of the NFFR Arm, below Big Bend reservoir. During the entire nesting season, approximately 30 percent of the foraging flights occurred along the NFFR about 2.5 miles upstream of Poe powerhouse. Overall, the pair appeared to favor hunting in shallow portions of pools, where fish were more readily available.

Prey studies conducted in 1985-1987 (PG&E, 1988) and again in 1999-2000, showed the Poe powerhouse eagles preyed on a combination of native and introduced fish species from both reservoir (e.g., Lake Oroville) and NFFR riverine habitats. Sacramento sucker and bass were the most common prey species (26.3 percent each in the 2000 study), followed by common carp and Sacramento pikeminnow. This pair will also occasionally prey on birds, but much less often. From the 1985-1987 study to the more recent study, bass have increased as prey choice, whereas catfish have decreased. Within Big Bend reservoir and large pools of the NFFR, Sacramento suckers and Sacramento pikeminnows were the most plentiful species.

b. Environmental Effects:

Valley Elderberry Longhorn Beetle

Because only one small elderberry plant was located during surveys, it is unlikely the VELB exists in the project area. PG&E has previously consulted with FWS for routine operations and maintenance activities that occur on all of PG&E's lands within the range of the VELB. An incidental take statement authorized take for a term of 30 years for the VELB (Service File No. 1-1-01-F-014, June 23, 2003, as cited in Interior's letter filed with the Commission on March 30, 2005). Because no VELB currently occur

Table 30. Productivity summary for the Poe powerhouse Bald Eagle Territory.
(Source: PG&E, 2003)

Year	Status	No. Young	Comments
1970	Unknown	-	Nesting activity suspected
1971	Successful	1	
1972	Successful	1	Female shot, male raised young
1973	Successful	1	
1974	Successful	1	
1975	Successful	2	
1976	Successful	2	
1977	Successful	1	
1978	Successful	2	
1979	Successful	1	
1980	Successful	2	
1981	Successful	2	
1982	Successful	1	
1983	Successful	2	
1984	Successful	1	
1985	Successful	2	
1986	Successful	2	
1987	Occupied, Not Successful	0	Egg material collected after failure
1988	Successful	2	One of these 2 young translocated
1989	Successful	2	
1990	Successful	1	
1991	Successful	2	
1992	Successful	1	
1993	Successful	1	
1994	Successful	2	
1995	Successful	1	
1996	Occupied, Not Successful	0	Incubated, failed
1997	Successful	2	
1998	Occupied, Not Successful	0	Incubated, failed
1999	Successful	2	
2000	Successful	1	
2001	Successful	2	
2002	Successful	1	
2003	Occupied, Not Successful	0	Incubated, failed

Known years occupied: 33

Young produced: 44

Young/occupied year: 1.33

within the project area, and potential habitat is minimal, the project would have no effect on the VELB.

California Red-legged Frog

Because of the generally steep topography in the project portion of the NFFR, suitable habitat for the CRLF is minimal. Habitat assessments conducted in 1998 as part of the Rock Creek-Cresta Project relicensing effort included the entire Poe Project area. The only suitable habitat found along the NFFR occurs at off-channel sites where ponds or pools have formed as a result of ground disturbances caused by mining, road building, and other activities that are outside of the project boundary and not affected by the project. No sites assessed within the project boundary were found to contain potential breeding habitat (EA Engineering and Ibis, 1998a). No CRLFs were found during amphibian surveys.

Because there are no CRLFs in the project area, and limited suitable habitat, the project would not be likely to adversely affect the CRLF.

As discussed in section V.C.3, *Terrestrial Resources*, Interior and the Forest Service both recommend amphibian monitoring plans. These plans would result in amphibian monitoring surveys conducted over the term of the license to determine the response of amphibians to increased instream flows.

Although the amphibian monitoring plan is intended to monitor FYLF, surveys provide an opportunity for CRLFs to be identified if they move into the project area. Additionally, it would provide a mechanism for protection and enhancement measures to be put into place if the CRLF is found in the project area.

Bald Eagle

PG&E previously established a bald eagle nest territory management zone for the Poe powerhouse nesting territory (1988). Most of this management zone is on the PG&E land with small portions of private land in the southwest and southeast portions. PG&E proposes to continue following the guidelines contained in the plan for timber management, recreation, and hydroelectric power generation, as revised below. Based upon the findings of the relicensing studies, the 1988 study findings, and a Cal Fish and Game Bald Eagle Nesting Territory Management Plan, PG&E proposes the following management recommendations for the nesting territory near Poe powerhouse:

- Limit habitat alterations within the management zone to those that would enhance bald eagle nesting habitat and pose no hazard to eagles. Silvicultural practices that encourage long-term regeneration of large pines and reduction of fuel loading where necessary are examples.
- Between January 1 and July 31 of each year, no compatible habitat alterations would be allowed within a management zone with the exception of

emergencies. If a nesting attempt fails during a certain year, this restriction may be eased at the approval of the land or wildlife manager.

- Discourage new recreational developments or policy changes that would alter the current use of the nesting area by public users and prohibit new permanent access roads within a management zone.
- Maintain use restrictions in the management zone. Schedule non-emergency maintenance of power lines, such as vegetation removal or trimming operations, outside of the bald eagle nesting season.
- Managers should consider the effects of any proposed alterations to the operation or configuration of existing water facilities on the abundance of bald eagle prey species and availability of eagle foraging habitats from Poe dam/reservoir to Lake Oroville.
- Review the effects of the 2001 wildfire on eagle habitat and consider the needs of future eagle nesting habitat in the reforestation of the area.

Interior, in its 10(j) recommendation no. 6 recommends that PG&E update its Bald Eagle Management Plan for the Poe powerhouse within 6 months of license issuance, in consultation with FWS, the Forest Service, NMFS, the Water Board, and Cal Fish and Game, and implement it within 1 year of license issuance. This plan is intended to update the 1988 plan (PG&E, 1988) to reflect current and proposed project conditions. Interior recommends the plan focus on protection of habitat to ensure that suitable nesting, roost, and perch trees and stands would be available, as well as the identification of protection, enhancement, and mitigation measures that would minimize disturbance to nesting bald eagles. In particular, Interior is concerned that the proposed recreational improvements could have an adverse effect on the bald eagles nesting near Poe powerhouse.

Interior also recommends (10(j) recommendation no. 8) a recreation management plan. This plan would provide guidance and details concerning the design, implementation, and construction of recreation developments within and associated with the project area, while protecting fish and wildlife resources. The recreation management plan would address the effects of recreation developments and improvements and develop and implement appropriate mitigation, protection, and enhancement measures for fish and wildlife resources.

The Forest Service preliminary 4(e) condition no. 38 specifies that within 90 days of license issuance, PG&E should initiate consultation with the Forest Service and other appropriate resource agencies to review and update the existing Bald Eagle Management Plan for the project area. The Forest Service recommends that within 2 years of license issuance, this revised plan be filed with the Commission following approval by the Forest Service for portions of the plan involving Forest Service lands.

Our Analysis

Since 1970, the productivity of the Poe powerhouse bald eagle nesting territory (1.33 young/occupied year) has far exceeded statewide averages and recovery goals in the 1986 FWS Recovery Plan for the Pacific Bald Eagle (1.0 young/occupied year) (as cited in the letter from Interior filed with the Commission on March 30, 2005). Based upon this information, this nesting territory is successful under current project conditions. However, several changes in operating conditions and facilities are proposed by PG&E and recommended by resource agencies.

Fish make up the vast majority of the bald eagles' diet in the project vicinity. Studies in the project area showed that bald eagles preyed primarily on Sacramento sucker, bass, common carp, and Sacramento pikeminnow. For this reason, changes in reservoir operation or the flow regime (including implementation of higher minimum flows, pulse flows, more restrictive ramping rates, and recreation releases) that affect fish populations or foraging conditions would have the potential to affect bald eagles.

The operating conditions proposed by PG&E and/or the resource agencies (higher minimum flows, pulse flows and more restrictive ramping rates) would generally enhance fish habitat for potential fish prey species occurring in NFFR. In particular, higher minimum flows should result in benefits to Sacramento sucker and Sacramento pikeminnow populations in the bypassed reach, thus enhancing the prey base. According to bald eagle habitat use and foraging location studies conducted by PG&E in 2000, the majority of the foraging for reservoir fish species (bass, carp, and bullhead) takes place on Lake Oroville ; therefore, project operations are unlikely to affect this portion of the prey base. Further information on the effects of proposed operations changes on fish species can be found in section V.C.2, *Aquatic Resources*.

Although the bald eagle prey base in the NFFR should increase due to proposed changes in project operations, increased minimum flows could reduce foraging habitat there. During studies conducted in 1999-2000, it was found that approximately 30 percent of the foraging was conducted on the NFFR upstream from Poe powerhouse. All of the perching locations identified as being used by hunting eagles were above shallow portions of the river (shallow pools, channels, gravel bars, etc.) where fish are more vulnerable to eagle predation. As a result, increased minimum flows could reduce the amount of shallow water foraging opportunities in the 7.6-mile-long Poe bypassed reach.

Effects of implementing recreation flows, as proposed by the Boating Groups, would depend to a large extent on the timing (both time of day and time of year) of flow releases. Restricting boaters to the 10:00 a.m. to 4:00 p.m. period of the day would help to avoid disturbance during prime foraging hours. Since bald eagles are thought to be less sensitive to disturbance after fledging is complete (WDFW, 2004), restricting the program to the months of August, September, and October would have a lower potential for harm than would be the case earlier in the season. Because the bald eagle nest

location is downriver of the potential whitewater run, recreational releases are more likely to affect bald eagle foraging than nesting.

Bald eagles could also be affected by increases in recreational activities, because they are sensitive to disturbance. The area surrounding Poe powerhouse currently has a fair amount of human disturbance. In addition to the powerhouse activities themselves, there is a beach area below the powerhouse with camping, swimming, and fishing. There is also a train track that passes within about 1,000 feet of the nest, a nearby dirt road that provides access to Big Bend dam, and periodic landing of PG&E's helicopter at the powerhouse. Based upon the productivity of the nest, however, it is apparent that the bald eagles in this location are somewhat adapted to human disturbance and activity. This is most likely due to the nest occurring up a steep and inaccessible slope that keeps most of the disturbance away from the immediate nest location.

PG&E, however, proposes a number of recreational enhancements throughout the project area. These include facility improvements such as portable toilets, trash receptacles, signs, picnic tables, parking lot improvements, improved access routes, and trail development to recreation sites. At the Poe powerhouse near the bald eagle nest, a parking lot would be graded and graveled, the access road would be improved, and toilets would be installed. Forest Service preliminary 4(e) condition 29 also specifies similar recreational enhancements. The specified recreation resource measures are discussed in more detail in section V.C.5, *Recreational Resources*. The construction, maintenance, and use of the facilities, especially those around Poe powerhouse, could create additional human disturbance to eagles during the nesting season. Although the nesting pair appears to be acclimated to human disturbance, it is unknown what their tolerance level is and whether or not the additional disturbance associated with the proposed enhancements would have an adverse effect on nest productivity.

Recreational uses that have the potential to disturb bald eagles are highest during the summer. Boating, fishing, swimming, and hiking during spring and early summer months would coincide with the time of year when eagles are laying eggs and feeding young at the nest. Eagles may be slightly less sensitive to disturbance during June and early-July than they are earlier in the nesting stage, but forage availability and undisturbed access to forage can strongly affect rearing success (Johnsgard, 1990). Construction projects in the vicinity of Poe powerhouse, including improvements to roads and existing facilities, could probably be timed to occur outside the breeding season to prevent disturbance to nesting birds, but increased use of this site could cause long-term disturbance to bald eagles.

The bald eagle population in the project vicinity is currently being protected from recreational development by the existing PG&E bald eagle management recommendations. Because it is unknown whether increased minimum flows and recreation enhancements would have an adverse effect on bald eagle productivity, it is important to update the existing bald eagle management plan, as recommended by

Interior and the Forest Service, to address these new conditions, should they be implemented. Updating this plan would appropriately identify possible adverse effects to bald eagles resulting from changes in project operations, facilities, and human disturbance resulting from recreation use and provide a mechanism to develop and enforce protection measures. Additionally, the recreation management plan, as recommended by Interior 10(j) recommendation 8, would apply appropriate timing restrictions on construction and maintenance of recreation facilities within the bald eagle nesting territory.

Because existing management practices are already in place and PG&E has experience in developing bald eagle management plans at some of its other hydroelectric projects (e.g., the Pit 3, 4, 5 Project), we believe that this plan could be updated within less than 2 years of license issuance, as specified by the Forest Service. Development of the plan within 6 months of license issuance, as recommended by Interior, would provide the needed protection in a more timely manner.

Because of the potential disturbance to bald eagles from project recreation, changes in operation, and future construction activities, the project would be likely to adversely affect bald eagles.

c. Unavoidable Adverse Effects:

None.

5. Recreational Resources

a. Affected Environment:

The Poe Project is located in the Feather River canyon, on the NFFR in the Sierra Nevada Mountain foothills in Butte County. The project is surrounded by the Plumas National Forest, and approximately 144 acres of Forest Service lands are included within the project boundary. The project is located about 20 miles northeast of the city of Oroville, a full-service community of more than 13,000 residents. The climate in this area is mild year round, with brilliant colors in the fall and spring, hot and dry summers, and mild winters (Oroville Chamber of Commerce, undated).

Project Vicinity

The Bucks Lake Recreation Area, located approximately 10 miles northeast of the Poe Project, provides recreational opportunities ranging from primitive camping to resort areas providing rental cabins and restaurant services. Other facilities at Bucks Lake include areas for group and family camping, picnicking, boating, water-skiing, fishing,

and swimming. Approximately half of the Bucks Lake shoreline is owned by PG&E, and the other half is managed by the Plumas National Forest.

The Lake Oroville State Recreation Area, located adjacent to the southern boundary of the Poe Project, is operated by CDWR and managed by the California Department of Parks and Recreation (CDPR). The Lake Oroville State Recreation Area offers 16,000 water surface acres and 167 miles of shoreline to the public for camping, picnicking, horseback riding, hiking, sail and power boating, water-skiing, fishing, boat-in camping, and houseboating.

Immediately upstream of the Poe Project on the NFFR is the Rock Creek-Cresta hydroelectric project. Recreational facilities at that project include Shady Rest, a highway rest stop developed by PG&E in 1962, located 2.5 miles from Poe dam on the north side of State Highway 70 (see figure 2). In 1984, Shady Rest was updated to make it accessible in accordance with the Americans with Disabilities Act; this site offers 6 picnic tables, a restroom with a pit toilet, an information kiosk, and parking for 15 vehicles.

Whitewater boating opportunities are available at the Rock Creek-Cresta Project. Historically, flows suitable for whitewater boating occur in the spring and early summer but are erratic and difficult for boaters to use. As part of the SA for the Rock Creek-Cresta Project, PG&E provides recreational flows to facilitate whitewater boating one weekend a month during the summer and early fall months (June – October). Since 2002, PG&E provides recreational flow releases of 1,600 cfs in June, 1,200 cfs in July, and 1,000 cfs in August, September, and October on Saturdays in the Cresta section and on Sundays in the Rock Creek section of the NFFR. The Rock Creek section is broken into two subsections: Rogers Flat and Tobin. The Rogers Flat subsection begins below the Rock Creek diversion dam and ends at the Tobin Vista river access site. This run is approximately 5 miles long with an average gradient of 50 feet per mile. The Rogers Flat subsection is characterized as a Class III¹⁰ run according to the American Whitewater International Scale of River Difficulty, with the majority of the rapids being cobble and rock bars. The 3-mile-long Tobin subsection begins shortly after the Tobin Vista river access site and is characterized as a Class IV-V run. The first 1.2 miles drops 150 feet

¹⁰The American Whitewater Scale of River Difficulty: Class I, Easy: Fast moving water with riffles and small waves; Class II, Novice: Straightforward rapids with wide, clear channels which are evident without scouting; Class III, Intermediate: Rapids with moderate, irregular waves which may be difficult to avoid and which can swamp an open canoe; Class IV, Advanced: Intense, powerful but predictable rapids requiring precise boat handling in turbulent water; Class V, Expert: Extremely long, obstructed or very violent rapids which expose a boater to added risk; Class VI, Extreme and Exploratory: These runs have almost never been attempted and often exemplify the extremes of difficulty, unpredictability, and danger.

through a large boulder field complete with undercuts and sieves, but the gradient eases after that and the difficulty level drops to a Class III-IV. The Cresta section, which begins just below the Cresta diversion dam and ends at the Cresta powerhouse (see figure 1), immediately upstream of the Poe Project, is approximately 5 miles long and is characterized as a pool drop Class IV run; however, boaters launching at Shady Rest and taking out at Cresta powerhouse can enjoy a short Class III experience (American Whitewater website).

Project Recreational Resources

The 1.7-mile-long Poe reservoir is located at the upper end of the Poe Project (see figure 2). There are no formal recreation facilities at the 53-acre Poe reservoir; access to the reservoir is provided by short, user-defined trails from occasional turnouts along State Highway 70. Most of the shoreline provides informal access for fishing; however, due to the steep grade of the reservoir shoreline, not all of it is available for fishing. Also, due to limited space along the reservoir shoreline, it is not possible to develop a safe boat launch, so the reservoir is inaccessible for boating except for small car-top boats, canoes, or kayaks. Portions of the shoreline and the reservoir vicinity include sensitive plant species, as well as shoreline riparian and wetland vegetation. A small portion of the upper end of the reservoir is located on PG&E land but the majority of the reservoir is located on NFS land. The project boundary encompasses the entire Poe reservoir (see figures 2 and 3 for a map of the project and surrounding area, and the location of primary recreation sites).

The Poe bypassed reach of the NFFR, which is outside of the project boundary, extends 7.6 miles from Poe dam to just above the Poe powerhouse. The bypassed reach is used year round by anglers fishing for rainbow trout and smallmouth bass, and infrequently by whitewater boaters. There are no formal access sites located along the Poe bypassed reach or in the project boundary, but several vehicle turnouts are located along State Highway 70 and numerous informal access trails exist along the shoreline of the NFFR. Recreation users enjoy relaxing at the turnouts located on State Highway 70. The NFFR may also be accessed by road at Pulga, an old town site situated on the northwest shore of the river between Sandy Beach and a bridge on State Highway 70, approximately 0.25 mile below the Poe dam. However, recreational use at this site is limited due to the railroad tracks and rocky, steep slopes.

Daily flow levels in the Poe bypassed reach of the NFFR have been recorded at the Pulga stream gage since 1912. Flows suitable for whitewater boating in the Poe bypassed reach are typically between 500 and 2,500 cfs. According to the historical flow records, flows suitable for whitewater boating occurred in every month of the year prior to construction of the Poe Project. Prior to 1958, flows suitable for whitewater boating occurred 100 percent of the time during the month of August, and nearly 100 percent of the time during the months of July, September, and October. Since construction of the Poe Project, flows suitable for whitewater boating have not occurred in August, and

occur less than five percent of the time during the months of July, September, and October. Currently, flows suitable for whitewater boating occur approximately 21 percent of the time in March, 16.7 percent of the time in April, 14.6 percent of the time in February, and less than 12 percent of the time in May.

The first 3.6 miles of the bypassed reach (i.e., the upper section of the bypassed reach) extends from Poe dam to Bardee's Bar and has a 260-foot drop in elevation. Large boulders occur in this section of the river and the gradient drops 72.9 feet per mile. This section of the river is typically 45 to 120 feet wide; however, at its narrowest point it is 30 feet across and at its widest point it is 260 feet across. Approximately the first 3 miles of this section of the bypassed reach are on NFS land; the remaining 0.5 mile is on PG&E land. The upper section of the bypassed reach is generally characterized as Class V, with possible portages around two Class V-VI rapids.

Access to the upper section of the bypassed reach is located at Sandy Beach, an informal recreation access site located on NFS land on the east side of the NFFR, approximately 0.6 mile downstream of the Poe dam (see figure 2). This 1.3 acre site provides informal parking for approximately 20 vehicles, as well as user-defined trails that extend down to the NFFR, and a white sand beach area approximately 400 feet long and 100 feet wide. Sandy Beach is accessed via a 0.1 mile long dirt road off of State Highway 70 leading to the large and level parking area adjacent to the beach. Recreationists use Sandy Beach primarily for swimming, beach use, and relaxing. PG&E also reports some overnight use of this site. Bare ground and soil compaction are evident at both the beach area and the parking area, and some litter has also been observed in the parking area and along the trail leading down to the beach. Most of this site, except for a few stretches of the shoreline and the parking area, has slopes greater than 20 percent. The sandy beach is also steeply sloped. A narrow band of riparian vegetation extends through the site between the parking area and the beach and sensitive plant species may occur in this general area. Sandy Beach is also near the location of a cultural resource site and the largest concentration of FYLF in the project area. The primary public safety issue at Sandy Beach is the limited range of view for drivers at the turn out onto State Highway 70 from the parking area due to the angle of the approach to the highway.

The take-out location for the upper section of the bypassed reach, which is also the launch site for the lower section, is at Bardee's Bar, an informal recreation access site located on PG&E land on the west side of the NFFR, approximately halfway between the Poe dam and the Poe powerhouse at the end of Bardee's Bar Road (see figure 3). This site is a flat, dirt area left from construction activity in the Feather River canyon. This approximately 4.8 acre site is used for overnight camping, day use (relaxing, picnicking, hiking, and fishing), and informal parking. Bardee's Bar includes an unimproved parking area and user-defined trails providing access to the NFFR approximately 30 feet down a fairly rocky slope. Unrestricted vehicle driving and parking have affected this site, and created a barren core area of approximately 1,500 square feet. Abandoned construction

materials, as well as occasional litter from recreational shooting, overnight camping, and day uses are found at the site. An ephemeral creek bed to the west of the site contains some sensitive riparian and wetland vegetation. Bardee's Bar may be accessed by two dirt roads: Butte County Road 54545A (Bardee's Bar Road) and an extremely rugged dirt road descending from a spur from State Highway 70, almost directly above and to the west of Bardee's Bar. An old vehicle bridge at the site is now closed to public use, but remains a public safety concern. Bardee's Bar is a sensitive site due to cultural resources and sensitive plants located at the site and the presence of FYLF just below the site.

The remaining 4.4 miles of the bypassed reach, or the lower section, extends from Bardee's Bar to the Poe powerhouse and has a 200 foot drop in elevation. Large boulders also occur in this section of the river but the gradient only drops 45.3 feet per mile. This section of the river is typically 50 to 150 feet wide; however, at its narrowest point it is 35 feet across and at its widest point it is 350 feet across. The majority of the lower section of the bypassed reach is located on NFS land, but approximately 1 mile of the section is on PG&E land. The lower section of the bypassed reach is generally characterized as Class III to IV.

The take-out location for the lower section of the bypassed reach is the Poe powerhouse beach, an informal recreation access site located on the east side of the NFFR on PG&E land adjacent to and downstream of the Poe powerhouse (see figure 3). The 5-acre Poe powerhouse beach is entirely within the project boundary and includes a flat, sandy area that appears to have been disturbed by construction and periodic flooding; some debris at the site appears to be related to these events. Food-related trash is also found at this site. The site is composed of compact-resistant river stone and sand and provides informal parking for approximately 10 vehicles. The Poe powerhouse beach is accessed via Forest Service Road 22N37 (Poe powerhouse access road), a gravel road which terminates at the Poe powerhouse. Vehicle access to the NFFR is rocky and steep. Recreationists use the Poe powerhouse beach primarily for swimming, relaxing, and beach use. Car-top or hand launched boats are also launched at this site to access the Big Bend reach of the NFFR downstream. PG&E reports some informal camping at this site. Recreation users also enjoy the slow water in this section of the river through the use of rafts and air mattresses. Sensitive wetland and/or riparian vegetation occur on an island in the NFFR less than 50 feet from the Poe powerhouse beach, and a bald eagle area of occurrence (an eagle nest) is located southwest of this site.

Poe Beach is another informal recreation access site located on NFS lands on both sides of the NFFR, approximately 0.5 mile upstream of the Poe powerhouse. The two small beaches, one on either side of the river, total approximately 0.3 acre. The trailhead to Poe Beach is accessed directly from a small pullout area on Forest Service Road 22N37 (Poe powerhouse access road) just north of the powerhouse and the river bridge. Poe Beach is remote and difficult to reach and may be accessed only by climbing down a steep hill with a fixed-rope aid system along the trail. The steep trail approach to the

beach from the parking area is the primary public safety issue at the site, particularly the fixed ropes, many of which are old and frayed nylon nautical rope. Recreationists participate in swimming, beach use, and relaxing at Poe Beach. Resource concerns are primarily minor erosion and soil stability on the steep trail down to the beach. A narrow band of riparian and/or wetland vegetation also extends into the northern end of this site. The trailhead, the trail down to Poe Beach, and a portion of the beach closest to the trail, are located within the Poe Project boundary.

Big Bend dam, approximately 0.75-mile downstream of the Poe Project, is currently part of the Oroville Project, but PG&E proposes incorporating approximately 21 acres associated with the Big Bend dam and reservoir into the Poe Project boundary (see figure 3). Fishing and dispersed recreation are known to occur at the Big Bend dam. The primary access for fishing at Big Bend dam is by boat from Lake Oroville. Whitewater boaters launching at the Poe powerhouse enjoy boating over the Big Bend dam as part of the Big Bend run of the NFFR (CDWR, 2005). The dam may also be accessed via a former access road, currently closed to vehicular traffic, which extends from Butte County Road 54545B (Big Bend Road).

Recreational Use

Recreational Use Studies

PG&E conducted a series of interrelated studies in the Poe bypassed reach at the four informal recreation access sites and at the vehicle turnouts off of State Highway 70 to evaluate visitor recreation use in this area. The studies included a recreation user count, a study of visitor attitudes and perceptions of recreation at the Poe Project, an angler creel survey, and a recreation capacity and suitability analysis. PG&E reported that the greatest number of visitors and vehicles were at Sandy Beach, followed by visitors to the Poe powerhouse beach. Bardee's Bar received the fewest number of visitors. PG&E observed only 7 boats during the surveys and they were all at the Poe powerhouse. Most of the 321 groups visiting the informal recreation access sites were day users (264 groups or 83 percent) with the overall purpose of rest, relaxation, and access to the river for swimming and wading during the warmer months. Overnight camping occurred at all sites except for the turnouts on State Highway 70. Even though Bardee's Bar had the fewest number of visitors, half of them were camping overnight.

PG&E reported that visitors to the informal recreation access sites along the Poe bypassed reach prefer solitude and wish to avoid crowding. Only visitors to Sandy Beach reported that they felt somewhat more crowded than "slightly crowded" (an average crowding level) while visitors to Bardee's Bar, Poe Beach, and Poe powerhouse beach reported that they felt "not crowded at all" to just less than "slightly crowded." Visitors surveyed at the State Highway 70 turnouts reported that felt "not crowded at all."

Visitors to all sites indicated a preference for the landscape to appear predominantly to totally natural in appearance.

PG&E analyzed recreation demand in the project area through the year 2035 and determined that participation in some of the activities currently enjoyed along the Poe bypassed reach of the NFFR, including swimming, beach use, picnicking, and biking, is expected to increase by between 75 percent and 100 percent. Participation in other activities enjoyed in the project area, including resting/relaxing, fishing (both shore and boat), primitive camping, and off-road vehicle use is expected to increase at a somewhat slower or moderate rate. However, PG&E determined that participation in hiking, observing wildlife, photography, non-motorized boating, and sightseeing in the project area is expected to increase more than 100 percent. PG&E's analysis of recreation demand also indicated that the population of Butte County is projected to increase by 92 percent by the year 2035, while the population of the state of California is expected to increase by only 61 percent by the year 2035. Thus, PG&E expects that the demand for recreational activities in the county would also be somewhat higher than the demands in the state as a whole. However, since most of the activities currently enjoyed are not facility-dependent, and visitors have indicated that they prefer the undeveloped nature of the sites, PG&E does not believe that there is a high demand for additional recreation facilities in the Poe bypassed reach.

During the angler creel survey, PG&E focused on angling use at four dispersed fishing access sites in the Poe bypassed reach: the area between the Cresta powerhouse and Poe dam, the area from Poe dam to Bardee's Bar, the area from Bardee's Bar to the Poe powerhouse, and the area below Big Bend dam. PG&E observed 31 anglers over 19 survey days. The majority of the survey participants fished the Poe powerhouse area, the area from Poe dam to Bardee's Bar, and the Bardee's Bar area. A few anglers were located on the stretch of river between Bardee's Bar and the Poe powerhouse. The 31 anglers included in the study fished for an average of 1.5 hours per angler (49 hours total) and caught about one fish for every 2 hours of fishing (24 fish). The anglers reported that the predominant fish species caught was rainbow trout, with brown trout and smallmouth bass also caught. Most anglers used flies or bait and a very small number used lures.

In its assessment of site suitability and capacity, PG&E determined that the recreation use level of Poe reservoir is approaching its capacity due to physical and facility limitations. PG&E determined that physical (spatial) capacity is a limiting factor because of the inaccessibility of the reservoir, steep topography, and lack of area for recreation site development. PG&E determined that facility capacity is a limiting factor due to the lack of parking. PG&E reports 53 acres of surface area at Poe reservoir and by assuming a standard of 10 surface water acres needed per watercraft, PG&E estimates that the reservoir could accommodate a total of five boats at any one time.

PG&E determined that recreational use of Sandy Beach is approaching its capacity, primarily because of potential ecological effects. PG&E determined that

ecological capacity is a limiting factor at Sandy Beach due to scattered debris, possible sanitation problems during peak use periods, existence of riparian vegetation at the site, and the possible occurrence of sensitive plant species at the site. These factors limit the level of recreational use at this site.

PG&E determined that dispersed recreational use at Bardee's Bar is generally considered to be at capacity due to a number of indicators, including natural and cultural resource sensitivity. PG&E determined that ecological capacity is a limiting factor at Bardee's Bar, due to scattered debris, possible sanitation problems related to overnight dispersed camping, the presence of riparian and wetland vegetation, and cultural resource constraints. PG&E also determined that due to the lack of developed facilities at this site, public safety concerns along the rough access roads and steep trail routes, facility capacity is also a limiting factor at Bardee's Bar. Factors contributing to ecological and facility capacity limit the level of recreational use at this site. PG&E also determined that expansion of Bardee's Bar is limited along the shoreline due to topographical constraints and flooding potential.

PG&E determined that current use of Poe Beach is at capacity, primarily due to physical and facility limitations. PG&E determined that physical capacity is a limiting factor due to high flood potential at this site and extreme topographical constraints. According to PG&E, facility capacity is also a limiting factor here because the small pullout area on Forest Service Road 22N37, used for parking at this site, will only accommodate 4 to 6 vehicles, resulting in extensive overflow parking, and also due to the steep trail approach to the beach which requires using a fixed-rope aid system that is in poor condition. PG&E also determined that ecological capacity is a limiting factor at this site due to the condition of the trail, possible sanitation problems related to dispersed camping and day use activities, and the existence of sensitive plant species.

PG&E determined that recreation use of the Poe powerhouse beach is approaching its capacity due to ecological and facility limitations. In addition, PG&E states that ecological capacity is a limiting factor due to the existence of sensitive vegetation on the island next to the site and the existence of a bald eagle area of occurrence adjacent to the site. PG&E also determined that facility capacity is a limiting factor at this site due to the rough and rocky access road, particularly if visitors want to launch a boat.

Controlled Flow Study

In this study, PG&E assessed boating flows on both sections of the Poe bypassed reach of the NFFR to determine how the flows affect the boating experience.

Upper Section: The 3.6-mile-long upper section of the Poe bypassed reach of the NFFR begins at the Poe dam and ends at Bardee's Bar. PG&E provided three flows in the upper section for the controlled flow study: 495 cfs, 800 cfs, and 1,400 cfs. Nine boaters participated in the study at the 495-cfs flow and the 1,400-cfs flow: eight used

hard shell kayaks and one used a decked C1 kayak. Ten boaters participated in the study at the 800-cfs flow: nine used hard shell kayaks and one used a decked C1 kayak.

PG&E reported that while the participants in the controlled flow study were unanimous in their desire to return to the upper section at all flow rates, optimum flow estimates for this section ranged from 1,000 to 1,300 cfs, with an average of 1,145 cfs. None of the boaters rated any of the flows to be totally unacceptable. Participants reported three portage locations in this section, one of which was used by all boaters at all flows. Four potential hazards were reported in the upper section: three were related to “sleeper” rocks located just under the water surface at the 495-cfs and 800-cfs flow levels and the fourth hazard was a narrow channel width experienced at the 800-cfs flow level. A majority of the boaters indicated that they preferred the quality and characteristics of boating this section at the 1,400-cfs flow, with the exception of safety and the number of portages. The 800-cfs flow was considered the most preferred for safety and the number of portages. Participants reported that this section was aesthetically pleasing at the 495-cfs flow level with its waterfalls, rock walls, and its wilderness appearance, but that the steep hydraulics and whitewater resources of this section were emphasized at the 1,400-cfs flow level. Participants generally rated this section of the river as a Class V, with one participant rating it as a low Class V.

At the launch site (Sandy Beach), the majority of the study participants gave excellent ratings to the ease of access, the distance from the parking area to the water, the slope of the bank access, and the distance from the launch site to the first rapid. Participants’ opinions of the amount of available parking were split between “excellent” and “good.” At Bardee’s Bar (the take-out location), the majority of the study participants rated the amount of available parking and the distance from the last rapid to the take-out as “excellent,” while the distance from the water to the parking area and the slope of bank access were rated “good.” Participants’ opinions of the ease of access of the take out location were split primarily between “excellent” and “good,” with one participant reporting that it was “poor.”

Lower Section: The 4.4-mile-long lower section of the Poe bypassed reach of the NFFR begins at Bardee’s Bar and ends at the Poe powerhouse. PG&E provided three flows in the lower section for the controlled flow study: 495 cfs, 800 cfs, and 1,250 cfs. Twelve boaters participated in the study at the 495 cfs flow: eight used hard shell kayaks, three used catarafts, and one used a decked C1 kayak. Fourteen boaters participated in the study at the 800 cfs flow: 10 used hard shell kayaks, three used catarafts, and one used a decked C1 kayak. Eleven boaters participated in the study at the 1,250 cfs flow: seven used hard shell kayaks, two used catarafts, and two used decked C1 kayaks.

PG&E reported that the participants in the controlled flow study indicated that the estimated minimum flow required to boat the lower section ranged from 500 to 1,200 cfs, with an average of 856 cfs. However, the participants also reported that they were less

likely to return to the lower section at flows of 495 cfs or 800 cfs, and most of the boaters rated the 495 cfs flow level as “totally unacceptable.” The optimum flow estimates for this section ranged from 1,200 to 2,500 cfs, with an average of about 1,900 cfs. Participants reported that while no portages were necessary in this section at any flow, up to 100 hits and five boat drags were reported at the 495-cfs flow level. At the 800-cfs flow level, the maximum number of hits was reduced to 30 and there was only 1 boat drag. At the 1,250-cfs flow level, the maximum number of hits was further reduced to 6, and no boat drags were reported. Ten potential hazards were reported in the lower section: six were related to rocks located just under the water surface at all flows, two indicated exposed boulders at the 495- and 800-cfs flow levels, and there were two reports of submerged vegetation at the 495-cfs flow level. A majority of the boaters indicated that they preferred the quality and characteristics of boating this section at the 1,250-cfs flow. The quality and characteristics of the 495-cfs flow was considered the least preferred by all boaters. Participants reported that even though this section was considered highly scenic at the 495-cfs flow level, the 1,250-cfs flow level provided wilderness feel, a higher quality of rapids, and an abundance of places to exit the main channel for swimming or relaxing. Participants generally rated this section of the river as a Class III+.

At the launch site (Bardee’s Bar), the majority of the study participants ranked the ease of access from “poor” to “fair,” while the distance from the launch site to the first rapid and the amount of available parking were both considered “excellent.” The distance from the parking area to the water and the slope of the bank access were considered “good.” At the take-out location (Poe powerhouse), the majority of the study participants gave excellent ratings to the ease of access, the distance from the parking area to the water, the slope of the bank access, the distance from the launch site to the first rapid, and the amount of available parking.

b. Environmental Effects:

Recreation Plan

In its section 10(j) recommendation no. 8, Interior recommends that PG&E submit to the Commission, for approval, a recreation management plan. Interior indicates that the purpose of the recreation management plan is to provide guidance and details concerning the design, implementation, and construction of recreation developments within and associated with the project area while protecting fish and wildlife resources. Interior recommends that the plan address the effects of recreation development, related activities, and improvements on fish and wildlife resources, and should coordinate development and implementation of appropriate mitigation for such effects. Interior recommends that all of the recreation developments described in the recreation management plan be implemented and completed within three years of license issuance. Interior further recommends that the plan also include resource measures that protect,

mitigate, and enhance fish and wildlife resources from the effects of recreation development and related activities in the project.

In its preliminary section 4(e) condition no. 29, the Forest Service specifies that within 6 months of license issuance, PG&E file with the Commission a Forest Service-approved recreation enhancement, construction, and implementation plan outlining the project-specific construction details and schedule for a variety of recreation projects. The Forest Service also specifies that PG&E maintain the recreation sites located on NFS lands in accordance with its February 5, 2002, (or as amended) Meaningful Measures for Quality Recreation Management standards for health, cleanliness, and resource protection.

In its May 23, 2005, filing in response to the Forest Service, PG&E points out that during the amphibian surveys completed in 2001-2003, multiple recreation-related effects on FYLF and associated habitats were documented at Poe Beach, Bardee's Bar, and in the Flea Valley Creek area near Sandy Beach. PG&E states that observed disturbance factors included dislodging egg masses, dispersing and possibly trampling tadpoles during swimming, wading, and mining activities, and collection (take and removal) of FYLF metamorphs (juvenile frogs) by recreationists. PG&E states that improving access to Sandy Beach, Bardee's Bar, Poe Beach, and the Poe powerhouse area may increase recreation-related effects on FYLF known to use these areas seasonally and year-round. Additionally, PG&E proposes to develop a plan to minimize or eliminate potential effects on FYLF during the removal of the Bardee's Bar bridge.

In recommendation no. 3 of its April 11, 2005, filing, Butte County states that PG&E should develop a recreation management plan to establish detailed specifications and performance standards for recreational facilities. Butte County recommends that PG&E include the following items in the recreation management plan:

- drawings and specifications for facility construction,
- estimates of the expected use levels at each site,
- performance standards for the conditions of facilities appropriate to protect public health and safety,
- triggers for improvements in facilities if use exceeds expectation or as appropriate for public health and safety, and
- standards for facility maintenance, including a schedule to inspect and maintain facilities on a weekly schedule, unless such inspections determine the need for more frequent inspection and maintenance.

Butte County also recommends that PG&E develop and implement the recreation management plan in consultation with a recreation management team or committee, whose members would be representatives of THE WATER BOARD, Cal Fish and Game, CDBW, and Butte County. Butte County recommends that PG&E consult with Butte County, the Forest Service, Cal Fish and Game, and CDBW regarding measures within their respective jurisdictions.

In its May 23, 2005, response to Butte County's recommendations, PG&E points out that the features of the recreation management plan proposed by Butte County have already been incorporated in the final license application and in the Forest Service preliminary section 4(e) conditions, and that an additional recreation management plan is unnecessary. PG&E also points out that it would develop drawings and specifications that would include the exact locations of improvements and trail dimensions to implement Commission approved proposals. PG&E states that it would design new facilities with public health and safety protection measures in mind and that during the term of the new license it would monitor and report on issues such as facility capacity, parking, road conditions, trail access, and environmental conditions. PG&E also states that it would make further recommendations for changes, if warranted, during every 10-year period, based on the results of the FERC Form 80 monitoring efforts. In addition, PG&E states that it intends to maintain the recreation sites located on NFS lands in accordance with the Meaningful Measures for Quality Recreation Management (as amended) standards for health, cleanliness, and resource protection. According to PG&E, the remaining sites would be operated and maintained in accordance with PG&E's existing operation and maintenance program (as approved by the Commission) that is currently in effect for all of PG&E's facilities along the Feather River canyon.

In its response, PG&E also points out that recreation use in the project area is extremely low and below capacity and that the recreation needs for this project are more limited than at other PG&E projects upstream of the Poe Project. PG&E states that the recreational opportunities at the Poe Project do not need or justify ongoing committee work, and that a recreation management committee, as suggested by Butte County, is unnecessary.

Our Analysis

A recreation plan would provide direction for the coordination of the development, management, and maintenance of recreational opportunities and facilities associated with the project. Also, developing a recreation plan may help ensure that the development and management of recreational facilities is coordinated with other resource management plans for the project area. As discussed below and in sections V.C.3, *Terrestrial Resources*, V.C.4, *Threatened and Endangered Species*, and V.C.7, *Cultural Resources*, some of the issues related to recreational use within the project area are associated with the effects of recreational use on sensitive resources such as the FYLF, bald eagle, and

cultural resources, and the need to limit recreational facility development and control recreational access. Currently, there are no recreation facilities within the project boundary, but those that have been proposed and recommended are proposed to be added to the project boundary. PG&E has stated that they agree with the recreation enhancement, construction, and implementation plan as specified by the Forest Service, which would outline the project-specific construction details and schedule for a variety of recreation projects. By implementing proposed recreation measures, PG&E would be responsible for ensuring that the recreational needs of the public are met throughout the licensing period. A recreation plan would also provide the means to address capacity issues, identify changing recreational needs during the term of any new license, and identify measures to control dispersed use that would, in turn, help limit the adverse effects of recreational use on project-area resources. Consulting with various entities regarding the development of a recreation plan, including any existing recreation committees who are focused on other projects in the NFFR watershed, would efficiently ensure that the recreation plan addresses issues, considers sensitive species, habitats, and sites, and includes the Plumas National Forest Land and Resource Management Plan (LRMP) standards for measures on NFS land.

The Forest Service Meaningful Measures for Quality Recreation Management provide national quality standards that define the level of quality the Forest Service expects to provide the public. The Forest Service national quality standards address health and cleanliness, safety and security, condition of facilities, responsiveness, resource setting, permit administration and monitoring, interpretive product development and revision, and interpretive product delivery and exhibit. Forest Service recreation program components with national quality standards proposed to be provided at the Poe Project include developed sites, trails, and interpretive services.

Poe Reservoir Recreation Enhancements

PG&E proposes that within 1 year of license issuance it would improve the existing 1,000-foot-long Cresta Trail to Poe reservoir, which runs from the gate at the head of the access road to the Cresta powerhouse down to a small sandy beach located on Poe reservoir (see figure 2). PG&E proposes that the trail would be sufficiently wide to allow carrying of a canoe or other similar watercraft to the reservoir. PG&E would install and maintain informational and regulatory signs indicating a “pack-it-in, pack-it-out” policy at the trailhead (visitors are responsible for removing all litter and debris they bring to the site) and would install signs on State Highway 70 indicating the availability of access to the reservoir.

In its preliminary section 10(a) recommendation no. 29D, the Forest Service recommends that within 3 years of license issuance, PG&E improve the existing Cresta Trail running from the west end of the informal parking area at Cresta powerhouse to a small sandy beach located on Poe reservoir and install and maintain informational signs like those proposed by PG&E. The Forest Service recommends that trailhead parking

would be located on the existing turnout just west of the gate located on the road to the powerhouse. The Forest Service recommends that Caltrans approve any parking improvements, including the surfacing of the parking area, the transition from the highway to the parking area, trimming of trees for visibility, and the associated highway striping. The Forest Service recommends that PG&E may request an amendment to be relieved of this requirement if Caltrans imposes conditions for approval deemed to be cost ineffective by PG&E and the Forest Service. The Forest Service recommends that PG&E maintain any access to Poe reservoir for the duration of the license term.

In recommendation no. 4A of its April 11, 2005, filing, Butte County recommends that at Poe reservoir, PG&E construct and maintain recreational facilities on the high-flat or other appropriate areas in the vicinity of the Cresta powerhouse. Butte County recommends that PG&E move the existing PG&E gate to a location on the powerhouse access road below the turn-out to the high-flat area; install and maintain a new gate on the gravel access road loop at the edge of the high-flat area; construct and maintain a vehicular barrier of post, rail, or boulder, along the edge of the high-flat area between the two gates; install and maintain three picnic tables at the west end of the high-flat area (located to separate users and take advantage of shade); install and maintain portable or vault toilets and trash receptacles in appropriate locations commensurate with use and pursuant to Forest Service use standards; and maintain these facilities weekly during the season of use or more frequently, commensurate with use. Butte County also recommends that PG&E permit access to Poe reservoir for hand-carried boats and angling by keeping the access gate open during daylight hours in the summer season; improving the existing Cresta Trail from the west end of the high-flat area downstream to the eddy beach to accommodate pedestrian passage, including hand-carrying of boats such as inner tubes, kayaks, and canoes; and conducting brushing and trail modification for ease and safety of pedestrian use. Butte County further recommends that PG&E undertake appropriate measures to establish and maintain a viable recreational fishery at Poe reservoir, including stocking, in cooperation with Cal Fish and Game. Butte County further recommends that, with the approval of Caltrans, PG&E install and maintain appropriate signage on State Highway 70 to indicate recreational facilities and maintain safe traffic control.

In its May 23, 2005, filing in response to Butte County, PG&E points out that it has proposed improving the existing Cresta foot trail as recommended by Butte County. PG&E points out that Poe reservoir provides minimal recreation opportunities and has current and projected low use levels. PG&E also describes two public recreation access areas in proximity to Poe reservoir: Sandy Beach, approximately 2.3 miles downstream of the Cresta powerhouse, and Shady Rest, approximately 2.5 miles upstream of the Cresta powerhouse. PG&E asserts that both of these sites are located on the NFFR, they provide excellent recreation opportunities for the public, and improvements at both of these sites have been proposed. PG&E states that the flat area located on PG&E land adjacent to the Cresta powerhouse is an aesthetically poor setting because of powerhouse

noise and limited visual quality and would not be open for public parking due to public safety and security reasons.

In comments filed on the draft EA, Butte County, American Whitewater, and Risa Shimoda recommend that PG&E develop a whitewater play feature on the NFFR below the Cresta powerhouse. Butte County and American Whitewater suggest that the feature would consist of a limited modification of the river channel to create waves, providing a challenge for boaters. Butte County and American Whitewater point out that a whitewater feature would not result in the loss of any power generation or require a biological assessment of flow fluctuations. Butte County and American Whitewater assert that the feature would provide boating opportunities virtually every day, therefore addressing the loss of year-round boating opportunities on the NFFR due to the project.

Our Analysis

Poe reservoir currently has very little recreational use, and PG&E estimates that the theoretical boating capacity of the reservoir is five watercraft. The steep topography along the reservoir shoreline limits the possibilities for further recreation site development. Providing directional signs on State Highway 70 would inform potential project visitors of the existence of the site. Informational/regulatory signs located at the trailhead indicating a “pack-it-in, pack-it-out” trash policy at this site would address sanitation issues at the site and could be used to inform project visitors about appropriate uses and areas for recreational activities and would subsequently help protect the project’s environmental resources from misuse by recreational visitors. The Cresta powerhouse is not staffed all the time, and providing unrestricted access to the unattended powerhouse may result in public safety and/or security issues at the site. Swimming and beach use are currently popular activities in the Poe bypassed reach and demand for these activities is expected to increase. Improving the Cresta Trail to Poe reservoir would improve the quality of the recreational resources by improving access to the reservoir. However, capacity is a limiting factor at the reservoir because of its steep topography and the lack of area for recreation site development. The immediate vicinity of the Cresta powerhouse, and the unimproved 1,000-foot-long Cresta Trail that extends from the head of the access road to Poe reservoir, are within the project boundary for the Rock Creek-Cresta Project. For these reasons we conclude that while improving the existing trail is needed to accommodate existing and future demand and would improve access to Poe reservoir, there is limited space available at the reservoir for further improvements.

As discussed in section V.C.2, *Aquatic Resources*, recent surveys in Poe reservoir indicate that hardhead, Sacramento sucker, and smallmouth bass are the predominant species in the reservoir. Earlier data showed that rainbow trout and brown trout once comprised a substantial percentage of the reservoir fish assemblage; those numbers have since decreased. Also, as discussed in section V.C.1, *Water Resources*, Poe reservoir is only 10 to 20 feet deep and therefore has limited storage capacity, resulting in a short

average resident time of approximately seven hours, which causes significant daily fluctuations in reservoir water surface elevations. The hydraulic conditions and habitat in the reservoir do not make it a good candidate for fish stocking; any stocked fish may not remain in the reservoir for an extended period of time to allow harvest by anglers. Angler use of the reservoir also appears to be low and we conclude that the benefits of any fish stocking appear to be limited.

We understand that whitewater parks or features provide a variety of whitewater activities for different skill levels and can be designed to accommodate low water flows. PG&E, however, has provided recreational flows to facilitate whitewater boating one weekend a month during the summer and early fall months (June – October) at the Rock Creek-Cresta Project, immediately upstream of the Poe Project. Whitewater boating demand for that portion of the NFFR has been high every year that PG&E has provided flows. As described above, boaters using the Cresta section of the NFFR take out at the Cresta powerhouse, which is within the project boundary for the Rock Creek-Cresta Project. Therefore, we do not see a need to provide a whitewater feature in this location at this time.

Sandy Beach Recreation Enhancements

PG&E proposes to provide the following recreational enhancements at Sandy Beach within 2 years of license issuance: grading and regrading the existing access road and parking area; adding informational and regulatory signs; installing a portable toilet at the parking lot during the recreation season; providing a trash receptacle during the recreation season; constructing a hardened trail or stairway to the beach area from the parking area; and improving ingress and egress to the site from State Highway 70 by installing directional signs and clearing vegetation. PG&E also proposes to periodically provide trash dumping and cleanup, portable toilet pumping, and tree and shrub trimming at the entrance to State Highway 70. PG&E proposes maintaining the improvements at Sandy Beach for 5 years following license issuance and then evaluating the use patterns at Sandy Beach with the Forest Service and determining whether to continue the existing program for another 5 years, or if significant problems are occurring, implementing a plan for more permanent facilities. PG&E proposes that the cost of any additional facilities would be shared by PG&E and the Forest Service.

In its preliminary section 4(e) condition no. 29E, the Forest Service specifies that PG&E provide the following improvements at Sandy Beach within 3 years of license issuance and maintain them for the duration of the license term: obtain the approval of Caltrans for work associated with the transition to the access road from State Highway 70, including signage requirements for eastbound traffic; grade the existing access and parking area and surface it with crushed rock; pave the transition from State Highway 70 to the beginning of the parking area; add regulatory signs (i.e., camping limit, campfire requirements, trash); install two portable toilets at the parking lot during the recreation season; provide a trash receptacle during the recreation season; maintain

the restrooms and trash cleanup at the site to Forest Service Meaningful Measures standards for health and cleanliness; construct a hardened trail or stairway to the beach area from the parking area; and maintain the existing gate to facilitate closure as necessary. The Forest Service also specifies that PG&E would request that the Forest Service prepare and implement a site monitoring plan for a period of 5 years following the issuance of the new project license that would specify monitoring standards such as frequency of use counts, Limits of Acceptable Change monitoring criteria, and sanitary surveys. The Forest Service further specifies that PG&E may request an amendment to be relieved of this requirement if Caltrans imposes conditions for approval deemed to be cost ineffective by PG&E and the Forest Service. At the conclusion of the 5 years of monitoring, the Forest Service specifies that PG&E would evaluate the use patterns and determine whether construction of a permanent restroom facility is required. If PG&E and the Forest Service agree that a permanent restroom is necessary, the Forest Service recommends that PG&E would construct it within 1 year. The Forest Service specifies that within 6 months of completion of the recreation improvements at Sandy Beach, PG&E apply to the Commission to adjust the project boundary as needed, to incorporate the new facilities.

In recommendation no. 4B of its April 11, 2005, filing, Butte County recommends that, at Sandy Beach, PG&E install and maintain wooden tread-edge steps on the two informal trails currently located between the parking and beach areas; install and maintain two portable toilets and trash receptacles at appropriate locations during the primary season of use; and install and maintain appropriate signs on State Highway 70, with Caltrans' approval, to indicate recreation facilities and to maintain safe traffic control. Butte County recommends that signs provided on State Highway 70 would include: a "No Left Turn" sign on eastbound State Highway 70, a "No Right Turn" sign on the outbound access road, and a sign indicating "Left Turn Only – Turn-Around Available 0.25 mile east" located across State Highway 70 from the outbound access road. Butte County further recommends that PG&E would extend a traffic barrier along the north side of State Highway 70 into the access road alignment to prevent right turns onto westbound State Highway 70.

In its responses to the Forest Service and Butte County, in letters filed with the Commission on May 23, 2005, PG&E points out that the facility recreation needs identified in the final license application were based on a review of demand, supply, visitor survey, and capacity/suitability factors. PG&E points out the results of its 2001 recreation visitor survey, which showed that the median number of people observed at one time at Sandy Beach was 6 people. PG&E also states that according to the Forest Service standards, one portable toilet may accommodate 1 to 15 people and therefore, PG&E proposes to provide only one toilet and one trash receptacle, commensurate with use. PG&E also states that improving access to Sandy Beach may increase recreation-related effects on FYLF known to use this area seasonally and year-round (see section V.C.3, *Terrestrial Resources*, for more information on the FYLF in the project vicinity).

In its response to Butte County, PG&E also provided details of a meeting it had with Caltrans and the Forest Service on January 31, 2005, to discuss recreation improvements at Sandy Beach. PG&E explained that Caltrans recommended installing a “No Left Turn” sign for eastbound traffic, but rejected installing a barrier at the road entrance so that people leaving Sandy Beach would be forced to turn left instead of right. Caltrans rejected installing the barrier due to safety concerns for westbound traffic (the potential for a driver to hit the barrier and cause an accident) and operation and maintenance of State Highway 70 (plowing roads, etc.). PG&E also reported that Caltrans informed PG&E that even with the present road configuration, no accidents have been reported in that area within the last 10 years.

Our Analysis

According to studies conducted by PG&E in the Poe bypassed reach at the four informal recreation access sites and at the vehicle turnouts off of State Highway 70, Sandy Beach had the greatest number of visitors and vehicles. PG&E also determined that ecological capacity is a limiting factor at Sandy Beach, partially due to scattered debris and possible sanitation problems during peak use periods. Providing a trash receptacle and a restroom facility would improve user comfort and enjoyment and address sanitation issues at the site. Regraveling the existing access road and parking area and constructing a hardened trail or stairway to the beach area from the parking area would help prevent further degradation of the site and the sensitive resources located there by focusing users on less sensitive areas at the site. Improving ingress and egress to the site from State Highway 70 should help maintain the highway safety record in this area, particularly if use of the site increases. Providing directional signs on State Highway 70 would inform potential project visitors of the existence of the site and also contribute to maintenance of visitor safety. However, any new traffic signs provided along State Highway 70 should be at the discretion of Caltrans.

PG&E predicts that recreation user demand in Butte County, and particularly in the project area, will increase during the next 30 years. The Forest Service and Butte County have recommended an additional restroom facility at Sandy Beach because of this predicted demand. However, PG&E also discovered that recreationists in the Poe bypassed reach preferred solitude and a natural environment. It is possible that some recreation users will choose to recreate elsewhere once improvements are provided at Sandy Beach, reducing the need for additional restroom facilities. Of course, other recreation users who prefer to visit more developed areas may choose to visit Sandy Beach once improvements are provided at the site. PG&E proposes and the Forest Service recommends reevaluating use at this site in 5 years to determine if additional facilities are warranted. Monitoring recreational visitor use would be part of the recreation management plan, as described above, and would address capacity issues and identify changing recreational needs during the term of any new license. If the use of

Sandy Beach increases, and additional facilities are needed, it would be addressed through monitoring.

Sandy Beach is used as a primary access point to the Poe bypassed reach of the NFFR. A connection exists between project operations and recreational use of this facility, and therefore, providing the enhancements proposed by PG&E at Sandy Beach is needed to address existing and future demand and would address human health and safety needs at this site, as well as protect ecological resources.

Bardee's Bar Recreation Enhancements

PG&E proposes providing the following recreational enhancements at Bardee's Bar (see figure 3) within 2 years of license issuance: adding an informational/regulatory sign at the "Y" in the road on Bardee's Bar Road; installing a picnic table for overnight campers and day users; installing a restroom with a vault toilet; providing a trash receptacle; and removing the existing steel bridge. PG&E also proposes to periodically provide trash dumping and cleanup, and toilet pumping as needed. PG&E assumes that the county-maintained access road (Butte County Road 54545A or Bardee's Bar Road) would be left as is.

In its preliminary section 10(a) recommendation no. 29F, the Forest Service recommends that PG&E provide the following improvements at Bardee's Bar within 3 years of license issuance and maintain them for the duration of the license term: provide a directional sign reading "River Access" on the Bardee's Bar portion of the road junction with the Poe powerhouse road; install a picnic table; install a single vault toilet; and provide a trash receptacle. The Forest Service further recommends that PG&E service the toilet and pick up the trash commensurate with use of the site. The Forest Service recommends that the county-maintained access road (Butte County Road 54545A or Bardee's Bar Road) would be left as is. The Forest Service recommends that within 6 months of completion of the recreation improvements at Bardee's Bar, PG&E apply to the Commission to adjust the project boundary as needed to incorporate the new facilities.

In its preliminary section 10(a) recommendation no. 29G, the Forest Service recommends that within 4 years of license issuance PG&E conduct the following actions at the Bardee's Bar bridge site: remove the bridge members including wood decking materials and miscellaneous hardware from the site; obliterate the access roads leading to the top and bottom of the tunnel spoil pile by recontouring the road prism to better match the gradient of the adjacent slopes; remove the portion of the concrete bridge piers extending above the streambed; and cut all metal reinforcing material flush with the remaining pier foundation.

In its May 23, 2005, response to the Forest Service, PG&E states that improving access to Bardee's Bar may increase recreation-related effects on FYLF known to use this area seasonally and year-round.

In recommendation no. 4C of its April 11, 2005, filing, Butte County recommends that PG&E clean-up Bardee's Bar, including removal of the informal pit-toilet, fire rings, abandoned buildings, and construction debris. Butte County also recommends that PG&E install and maintain three picnic tables and fire rings, which would be designed to separate users and take advantage of shade, one vault toilet, and trash receptacles at appropriate locations. Butte County recommends that PG&E remove or repair the abandoned bridge at Bardee's Bar. Butte County also recommends that PG&E improve site access in cooperation with Butte County by installing and maintaining parking zones and barriers at appropriate locations to prevent damage to ecologically sensitive areas and to provide for reasonable pedestrian access to the main channel and site; constructing and maintaining a stable, low-maintenance crossing at Bardee's Creek that would be usable by 2-wheel drive vehicles; removing construction and other debris at the existing failed crossings; undertaking appropriate measures to respond to reported accidents or problems with road maintenance that may otherwise interfere with use by 2-wheel drive vehicles, including removal of slumps, downed trees, and washouts; and modifying the existing abandoned construction road to an all-weather casual hiking trail between Bardee's Bar and an improved scenic point downstream of the State Highway 70 bridge. Butte County recommends that the trail would be designed to prevent use by motorized vehicles and to avoid conflicts with other user groups, and would include signage indicating destination and mileage. Butte County further recommends that PG&E would identify recurrent problems in road maintenance associated with recreational use and undertake appropriate improvements.

In its May 23, 2005, response to Butte County, PG&E points out that according to its 2001 recreation visitor survey report, the median number of people observed on weekends at Bardee's Bar was 0.5 people. PG&E states that the extremely limited recreational use of Bardee's Bar is understandable because it is the most remote location in the project area. PG&E further points out that no recreational users were present on half of the 16 peak weekend and holiday days when researchers visited the site. PG&E also states that according to its 2001 recreation needs analysis, visitors to the project areas prefer the undeveloped nature of the existing informal recreation sites and do not desire highly developed recreation sites. PG&E states that its proposal to provide one picnic table and a trash receptacle at Bardee's Bar is sufficient for this area.

PG&E also points out in its response to Butte County that public access to Bardee's Bar is on a gravel county road and that Butte County is responsible for the maintenance and operation of this road, including the creek crossing site immediately upstream of Bardee's Bar. PG&E states that the condition of this road in some areas is moderate and appears to be degrading over time from erosion, but is still passable by 2-

wheel-drive vehicles. PG&E also states that it has investigated the existing abandoned construction road that Butte County recommends converting into a casual hiking trail. PG&E states that the first 0.75 mile of the trail is scenic as it traverses up the Feather River canyon, but that the remaining 1.25 miles meanders away from the NFFR and further up the Feather River canyon where there is little aesthetic value. PG&E also states that the recommended trail does not provide access to the edge of the NFFR, is located on the project's bypassed reach, and would not enhance recreational opportunities in the area.

In his September 14, 2006, comments on the draft EA, Michael F. Taylor states that the first 0.75 mile of the existing abandoned construction road extending upstream from Bardee's Bar would be the most scenic, with several outstanding views of the river and surrounding terrain in the distance, including spectacular views of two railroad tunnels and the railroad perched on nearly vertical cliffs. However, Mr. Taylor points out that modifying the existing abandoned construction road between Bardee's Bar and an improved scenic point downstream of the State Highway 70 bridge to an all-weather casual hiking trail would be a difficult undertaking because of numerous rock avalanches that have obliterated the road in places, replacing it with deposits of loose rock rubble. Mr. Taylor provides a description of an alternative abandoned trail that we address below in our discussion of a Poe Reach trail.

In its September 15, 2006, comments on the draft EA, PG&E states that the surface of the existing abandoned construction roadway extending upstream from Bardee's Bar is appropriate for a hiking trail but also cautions that it is overgrown with vegetation in some areas. PG&E also points out that there are many ephemeral streams crossing the abandoned roadway that are filled with slides containing boulder fields and/or scouring that has obliterated the roadway. PG&E points out that the primary uses of this trail would likely be casual hiking and wildlife viewing; swimming, fishing, boating, and other water-related activities would not be enhanced with this trail. PG&E also contends that this trail would potentially increase the number of users near sensitive resources. For these reasons, PG&E continues to believe that converting the abandoned construction road to a trail is unreasonable.

In its comments on the draft EA, PG&E points out that Bardee's Bar Road is a public road that is used to access a project recreation site but should not be included in the project boundary. PG&E states that it pays taxes to maintain public roads and therefore, should not be responsible for such maintenance.

In comments filed on the draft EA, NPS, Butte County, American Whitewater, and the Sportfishing Alliance advocate including Bardee's Bar Road to its juncture with the primary road in the Poe Project boundary. These entities contend that Butte County's easement does not require the county to maintain the Bardee's Bar Road and therefore they would like for PG&E to upgrade and maintain the road so that it is readily passable by two-wheel drive vehicles. NPS and the Sportfishing Alliance point out that the road's

current condition not only limits access for potential recreational users, but also limits the ability of the Butte County Sheriff's Department and the Forest Service to adequately police the road.

In his declaration attached to the September 19, 2006, comments filed by Butte County and American Whitewater, Shawn O'Brien, an employee of Butte County Department of Public Works, describes Bardee's Bar Road as a substandard, non-surfaced 6.2-mile-long road in Butte County extending from Bardee's Bar to its intersection with Big Bend Road. Mr. O'Brien points out that eight parcels adjacent to Bardee's Bar Road are owned by individuals other than PG&E and Union Pacific Railroad; dwellings are located on two of the parcels, consistent with two driveway encroachment permits issued by Butte County. Mr. O'Brien explains that Bardee's Bar Road is used by PG&E to access the Poe powerhouse, by Union Pacific Railroad to access the Union Pacific rail line, by private landowners accessing their dwellings and/or land, and by some recreationists. However, Mr. O'Brien further explains that PG&E's use of the road includes heavy equipment and large trucks, causing the majority of wear and tear on the road, including causing a slide located between the Poe powerhouse access road and the intersection of Big Bend Road. To ensure the safety of the traveling public who use the Bardee's Bar Road, Mr. O'Brien suggests repairing the slide, as well as some other locations where the road bed has completely washed out, and then reconstructing the entire road. Mr. O'Brien estimates that repairing and reconstructing the road would cost approximately \$2.6 million.

Our Analysis

Bardee's Bar was the most remote location researched by PG&E in its recreational use studies for the project and had the fewest number of visitors. Providing a directional sign on Bardee's Bar Road would inform potential project visitors of the existence of the site; an informational sign could be used to inform project visitors about appropriate uses and areas for recreational activities, and subsequently, would help protect the project's environmental resources from misuse by recreational visitors. Visitors use Bardee's Bar for both day use and camping, and the addition of a picnic table, restroom facility, and trash receptacle would improve user comfort and enjoyment and address sanitation issues at the site. PG&E predicts that recreation user demand in Butte County, and particularly in the project area, will increase during the next 30 years. Butte County has recommended additional picnic tables and trash receptacles at Bardee's Bar because of this predicted demand. However, these additional improvements do not appear to be needed at this time due to the limited number of visitors PG&E observed at the site during the recreation studies. PG&E also discovered that recreationists in the Poe bypassed reach preferred solitude and a natural environment, and the remote nature of Bardee's Bar lends itself to a more primitive and solitary experience. While the remote nature of Bardee's Bar is preferred, the enhancements proposed by PG&E at Bardee's Bar are needed to address human health needs at this site and to protect ecological

resources. In addition, monitoring use at this site would help address Butte County's concerns regarding future demand by providing a tool to help PG&E and Butte County determine if additional facilities are necessary in the future.

PG&E reported that 10 percent of the visitors to Bardee's Bar indicated they participated in hiking while visiting this site. There are no developed trails in the vicinity of Bardee's Bar, and PG&E did not provide information on specific locations or destinations that these individuals used for hiking. Butte County has recommended development of a trail in the Feather River canyon north of Bardee's Bar. PG&E reported that hiking is one of the activities expected to increase by more than 100 percent in the project area. In addition to the lack of developed trails in this area, however, there are also sensitive resources near this site. Nonetheless, even with the sensitive resources there is a need to develop a trail in this area. A trail that originates from Bardee's Bar would enhance recreational opportunities in the Feather River canyon and also could be used to divert users away from sensitive resources.

Removal of the abandoned bridge at Bardee's Bar that is both in disrepair and located in an isolated area would improve safety at the site. Removal of all of the materials associated with the bridge, as well as removal of other debris and construction materials at the site, would also improve user safety and benefit the aesthetic quality. We conclude that removing the abandoned bridge, as well as the other debris and construction materials at Bardee's Bar, is needed to address human health and safety issues at this site.

In 1927, PG&E's predecessor, the Great Western Power Company, granted an easement to Butte County for use of the Bardee's Bar Road where it crosses three distinct parcels of PG&E land. The approximately 7.02-mile-long Bardee's Bar Road originates at Big Bend Road and terminates at Bardee's Bar. Bardee's Bar Road was in existence when the Poe Project was constructed and currently provides access to some private lands, some NFS lands of the Plumas National Forest, and the three PG&E parcels, including the one at the north end of the road where Bardee's Bar is located. According to Mr. O'Brien's declaration, a slide occurred somewhere in the 1.3 miles of road between the Big Bend Road and the Poe powerhouse access road. Mr. O'Brien notes that PG&E would like to see that section of the road repaired in order to transport new penstock sections, via heavy equipment, to the Poe powerhouse area. However, only a 0.33-mile-long section of the Bardee's Bar Road crosses the PG&E parcel located between Bardee's Bar Road and the Poe powerhouse access road. We also note that penstock replacement is not part of its relicensing proposal; rather any such work, if needed, would constitute ongoing O&M operations. Any needed road improvements for that work would be addressed in that context. The maintained portion of the road terminates at the north end at Bardee's Bar, but an unmaintained section of the road continues north past Bardee's Bar up the Feather River canyon. Monitoring recreation

use at Bardee's Bar would help PG&E and Butte County determine if any modifications to the Bardee's Bar Road are necessary.

Poe Reach Trail

At our March 31, 2004, public scoping meeting in Oroville, California, Mr. Roland McNutt recommended replanking the bridge at Bardee's Bar and using it as part of a trail to the Poe powerhouse. Mr. McNutt explained that mountain bikers and hikers would be able to traverse a loop trail by using the Bardee's Bar road, the Poe powerhouse access road, and a newly created trail between Bardee's Bar and the Poe powerhouse.

In recommendation no. 4D of its April 11, 2005, filing, Butte County recommends that PG&E construct and maintain a trail between Bardee's Bar and Poe Beach, aligned adjacent to the flood-trim line of the west-side channel. Butte County recommends that the trailhead at Poe Beach end of the trail terminate at the next road turnout north of the Poe Beach turn-out and that PG&E develop four spur trails at various locations to provide pedestrian access to the river channel.

In its May 23, 2005, filing in response to Butte County, PG&E states that it and the Forest Service evaluated Butte County's recommended trail along the Poe reach using a low-flying helicopter to conduct a field review of the 3-mile stretch of river between Bardee's Bar and Poe Beach to assess the feasibility of constructing a river access trail. PG&E states that, based on its observations, very steep slopes of 60 percent or greater occur for approximately 0.75 mile, primarily at either end of the recommended trail; slopes of 20 to 60 percent occur for 1.5 miles; and slopes of less than 20 percent only occur along the remaining 0.75 mile. PG&E states that construction of a trail on streambanks with these slopes would require extensive cut and fill, as well as concrete reinforcement work below the trail to stabilize the streambanks. PG&E also points out that increased riverside use could potentially affect FYLF populations and bald eagle foraging. In addition, PG&E states that this proposed trail would be located on a bypassed reach and is not project related.

In his September 14, 2006, comments on the draft EA, Michael F. Taylor describes an existing abandoned trail that provides access to the NFFR approximately 0.75 mile downstream from Bardee's Bar, where the river changes direction from north-south to nearly east-west. The trail crosses a bedrock outcrop and continues approximately 2.8 miles downstream, closely paralleling the river and ending near the Poe powerhouse access road. Mr. Taylor points out that the north end of the trail is obscured by material sidecast during road construction and therefore does not quite extend to Bardee's Bar road; however, connecting the trail to the road is possible and should not be difficult. Mr. Taylor suggests that the trailhead at the south end of the trail could be located a few hundred feet east of a switchback on the Poe powerhouse road, after constructing approximately 0.5 mile of trail. Mr. Taylor explains that the entire trail is passable without a great deal of difficulty and describes the trail condition as ranging

from very good with only light maintenance needed, to areas where nearly complete reconstruction is necessary. Mr. Taylor states that the Forest Service has mapped the location of this trail using a global positioning system and also has mapped features with cultural significance located in the vicinity of the trail. Mr. Taylor points out that the trail crosses two private parcels owned by parties other than PG&E and states that Forest Service staff has made preliminary contact with these land owners. Mr. Taylor describes several advantages to reopening this trail: (1) providing dispersed access to the NFFR; (2) year-round accessibility to the trail since it lies well below the winter snow zone; (3) easier to reach than the trailhead for the trail running upstream from Bardee's Bar; (4) aesthetically pleasing setting that is not marred by the presence of Highway 70 and the Union Pacific railroad; and (5) the views from the trail essentially represent the NFFR prior to development.

In their September 14, 2006, comments on the draft EA, NPS and the Sportfishing Alliance state that the trail described by Michael Taylor would provide significant angling access that is not currently available, and that the feasibility of this trail should be considered.

Our Analysis

PG&E reported that none of the surveyed visitors to the Poe bypassed reach participated in bicycling or mountain bicycling, and less than two percent of them participated in hiking. However, according to the results of PG&E's recreation demand study, hiking is one of the activities expected to increase by more than 100 percent in the project area during the next 30 years, and bicycling is expected to increase by between 75 and 100 percent during that time. Even with these increases, usage would be relatively low.

Using the abandoned bridge at Bardee's Bar as part of a trail to the Poe powerhouse would provide access to the east side of the NFFR, which is also the location of the Union Pacific Railroad. There is not enough land on the east side of the NFFR to accommodate both the railroad tracks and a trail for pedestrians and bicycles. The abandoned bridge at Bardee's Bar is in disrepair, is a public safety hazard, and is aesthetically unpleasant. As stated in the Bardee's Bar discussion above, removal of the bridge would improve both safety and aesthetic issues at the site.

Creation of a trail on the west side of the NFFR would eliminate potential conflicts between hikers or bicyclers and the railroad and still allow for a loop trail when using the Bardee's Bar road and the Poe powerhouse access road. However, slopes of greater than 20 percent occur along the majority of the NFFR shoreline between Bardee's Bar and Poe Beach. In general, slopes greater than 20 percent are not favored for trail location due to the potential for erosion and slope failure. Therefore, in part due to the lack of suitable slopes for trail creation, the current low use of the project bypassed reach for hiking and

mountain bicycling does not support the need for the creation of a trail in this particular location.

However, as discussed in our analysis of recreational enhancements at Bardee's Bar, there is a need to develop a trail in this area in order to enhance recreational opportunities in the Feather River canyon and also to divert users away from sensitive resources. Butte County recommends modifying an abandoned construction road to an all-weather casual hiking trail between Bardee's Bar and an improved scenic point downstream of the State Highway 70 bridge. PG&E and Michael Taylor estimate that converting this road into a trail would be difficult, as well as costly. However, Mr. Taylor describes an alternative abandoned trail in this area that would require both minor modifications and negotiations with private landowners due to its location. We agree that there are several advantages to reopening this trail.

Poe Beach Recreation Enhancements

PG&E proposes to provide the following recreational enhancements at Poe Beach (see figure 3) within 2 years of license issuance: replacing the rope-guided trail with steps or a primitive, stable, safe switchback trail, and providing signs indicating a "pack-it-in, pack-it-out" trash policy and informing users of the public restroom facility located a few hundred yards down the road at the Poe powerhouse. PG&E also proposes to monitor trash levels and roadside parking.

In its preliminary section 4(e) condition no. 29C, the Forest Service specifies that PG&E provide the following improvements at Poe Beach within 3 years of license issuance and maintain them for the duration of the license term: replace the rope-guided trail with a combination of stairs and a primitive, stable, switchback trail (the stairway and primitive trail design, construction materials, placement, and construction schedule would be approved by the Forest Service) and provide signage at the bottom of the trail indicating a "pack-it-in, pack-it-out" policy and also informing users of the public restroom facility at Poe powerhouse. The Forest Service further specifies that within 6 months of completion of the recreation improvements at Poe Beach, PG&E would apply to the Commission to adjust the project boundary as needed to incorporate the new facilities.

In its May 23, 2005, response to the Forest Service, PG&E states that improving access to Poe Beach may increase recreation-related effects on FYLF known to use this area seasonally and year-round.

In recommendation no. 4E of its April 11, 2005, filing, Butte County recommends that at Poe Beach, PG&E construct and maintain a trail along the east side of the NFFR channel, through the boulder field on the channel margin, to connect to the rope scramble at the east side bridge abutment for emergency egress, and install and maintain a sign at Poe Beach stating that casual floaters should exit the river above the bridge.

In its May 23, 2005, response to Butte County, PG&E states that a trail on the east side of the NFFR channel would not be appropriate because it would have potential effects on FYLF populations (see section V.C.4, *Threatened and Endangered Species*, for more information on the FYLF in the project vicinity). PG&E also points out that its relicensing studies demonstrated a need for a primitive, stable switchback trail to replace the rope-guided trail, and a need for a sign at the trailhead indicating a “pack-it-in, pack-it-out” trash policy and informing users of the public restroom facility located a few hundred yards down the road at the Poe powerhouse.

Our Analysis

Through its recreational use studies, PG&E determined that current use of Poe Beach is at capacity, primarily due to physical and facility limitations. Expansion of the site could possibly alleviate some of the capacity concerns, but physical limitations due to topography prevent expansion of the site and expansion would also modify visitors’ primitive experience. Informational signs indicating a “pack-it-in, pack-it-out” trash policy at this site and also informing visitors of the restroom available at the Poe powerhouse would address sanitation issues, could be used to inform project visitors about appropriate uses and areas for recreational activities, and would subsequently help protect the project’s environmental resources from misuse by recreational visitors. Replacement of the rope-guided trail with a combination of stairs and a primitive, stable, switchback trail from Forest Service Road 22N37 would improve user comfort and enjoyment, would address safety issues associated with the current fixed rope system used to access the site, and would also address resource issues related to soil stability and erosion on the steep slope leading to the beach. As discussed in section V.C.3, *Terrestrial Resources*, the area near the trail and roadway would need to be surveyed prior to any ground-disturbing activities to determine the presence of any sensitive plant species. Monitoring usage at this site would help PG&E, the Forest Service, and Butte County determine whether the proposed and recommended facilities are adequately addressing resource, sanitation, and safety issues at the site and if any additional facilities are necessary in the future. We conclude that providing the enhancements proposed by PG&E at Poe Beach is needed to address safety needs at this site, as well as to protect ecological resources.

With respect to Butte County’s recommendation for a trail on the east side of the NFFR, the east side of the NFFR is, as discussed above, the location of the Union Pacific Railroad, which limits the feasibility of a trail there. In addition, a trail on the east side of the NFFR may affect FYLF populations (see section V.C.4, *Threatened and Endangered Species*, for more information on the FYLF in the project vicinity).

Poe Powerhouse Recreation Enhancements

PG&E proposes to provide the following recreational enhancements at the Poe powerhouse within 2 years of license issuance: regrading and graveling the short access road leading down to the lower beach level; grading an area large enough for 10 vehicles at the lower level close to the existing road; installing a universally accessible single vault toilet that meets the Americans with Disabilities Act Accessibility Guidelines at the upper access road/parking area; providing a trash receptacle; installing warning signs upstream of Big Bend dam; and adding an informational regulatory sign. PG&E also proposes to periodically provide dumping of the trash receptacle and pumping of the vault toilet.

In its preliminary section 10(a) recommendation no. 29B, the Forest Service recommends that PG&E provide the following improvements at the Poe powerhouse within 3 years of license issuance and maintain them for the duration of the license term: regrade the short access road leading down to the lower beach level and surface it with gravel; grade an area of sufficient size to accommodate 10 vehicles at the lower beach level close to the existing road; place boulders around the parking area on the beach side to prevent vehicles from being driven over the lower beach; install a universally accessible single vault toilet at the upper access road/parking area in the vicinity of the powerhouse and maintain the toilet structure in a properly functioning condition; provide and maintain a trash receptacle; and install informational signs regarding picking up trash, forest manners, etc. The Forest Service further recommends that PG&E service the toilet and pick up the trash commensurate with use of the site.

In its May 23, 2005, filing in response to the Forest Service, PG&E states that improving access to the Poe powerhouse area may increase recreation-related effects on FYLF known to use this area seasonally and year-round.

In its April 11, 2005, filing, Butte County recommends, in recommendation no. 4F, that at Poe powerhouse PG&E clean up the existing site, including removing informal pit-toilets, fire rings, waste concrete, abandoned mid-channel pilings, and other concentrated and dispersed debris; installing and maintaining one vault toilet and trash receptacle at appropriate locations; improving access by smoothing and surfacing the access road to the lower beach with gravel; establishing a parking area on the firmer surface area of the lower beach with enough space for vehicles to turn around and park; undertaking minor grading in the high parking area and an existing turn-out (between the railroad right of way and the powerhouse) to expand parking capacity; maintaining a passing turn-out at the existing turnout along the west side of the powerhouse fence; constructing and maintaining a trail along the east side of the NFFR channel in the vicinity of Poe Beach to provide for suitable and safe access for angling and other water contact recreation; and installing informational signs regarding picking up trash, forest manners, availability of parking, and other access and use conditions.

In its May 23, 2005, filing in response to Butte County, PG&E states that a trail on the east side of the NFFR channel between Poe powerhouse beach and Poe Beach would not be appropriate because it would have potential effects on FYLF populations. PG&E points out that according to its 2001 recreation visitor survey report, on weekends the median number of people observed at Poe powerhouse was 4 people and the median number of vehicles at one time was 1 car. PG&E states that its proposal to provide one trash receptacle and parking for 10 vehicles with trailers at Poe powerhouse is sufficient and commensurate with use. PG&E also points out that its proposed improvements at the Poe powerhouse are intended to concentrate and organize parked vehicles in an area away from project facilities to avoid the potential for public vehicles to block access to the powerhouse and to keep vehicles away from the river shoreline.

Our Analysis

At over 5 acres, Poe powerhouse beach is the largest informal recreation access site located along the Poe bypassed reach, and all of the boating activities observed during the recreation studies occurred at this site. At the head of the Big Bend impoundment, recreation users enjoy the slow water at this site using rafts and air mattresses. Whitewater boaters use this site as the take out location for the lower section of the Poe bypassed reach and the launch site for the Big Bend run of the NFFR, downstream of the Poe Project. Other recreationists use the Poe powerhouse beach primarily for swimming, relaxing, beach use, and some informal camping. During its recreation studies, PG&E reported that the greatest number of visitors to this site at one time was 26, and the average number of users at this site was 5.3. PG&E analyzed recreation demand at the Poe Project through the year 2035 and determined that participation in some of the activities currently enjoyed at the Poe powerhouse, including swimming and beach use, is expected to increase by between 75 and 100 percent. Participation in resting/relaxing and primitive camping, the other two primary activities enjoyed at the Poe powerhouse, is expected to increase at a somewhat slower or more moderate rate.

Providing a trash receptacle and a restroom facility would improve user comfort and enjoyment and address sanitation issues at the site. Providing a restroom facility that meets the Americans with Disabilities Act Accessibility Guidelines would improve accessibility in the Poe bypassed reach. Regrading and graveling the existing access road and parking area and constructing a hardened trail or stairway to the beach area from the parking area would help prevent further degradation of the site and the sensitive resources located there by focusing users on less sensitive areas at the site. Defining the parking area should eliminate the possibility of visitors blocking access to the powerhouse. The proposed informational/regulatory sign could be used to inform project visitors about appropriate uses and areas for recreational activities and consequently, would help protect the project's environmental resources from misuse by recreational visitors. Providing a warning sign upstream of Big Bend dam would help with

recreational user safety and the removal of all of the debris and construction materials at the site also would improve user safety and benefit the aesthetic quality of the site. To address human health and safety needs at this site, as well as to protect ecological resources, there is a need to provide the enhancements proposed by PG&E at the Poe powerhouse beach, as well as remove concentrated and dispersed debris.

Monitoring use at this site would help PG&E, the Forest Service, and Butte County determine if the proposed and recommended facilities are adequately addressing resource, sanitation, and safety issues, and if any additional facilities are necessary in the future. Monitoring also would allow PG&E to determine if there are any negative effects due to recreation use on sensitive resources associated with this site.

Scenic Viewpoint

PG&E proposes constructing a scenic viewpoint within 5 years of license issuance at a pullout on State Highway 70, just west of the Plumas National Forest boundary where a National Forest boundary sign is currently located. This site offers a good view into the Feather River canyon, including Bardee's Bar, the location of an informal project recreation area that provides access to the Poe bypassed reach. If the concept is acceptable to Caltrans, PG&E proposes preparing a plan for the scenic viewpoint, including conceptual drawings, an estimated cost for paving the existing graveled area, and placement of informational signs. PG&E recognizes that ingress and egress must conform to Caltrans standards but does not propose any new turning lanes for ingress and egress. If Caltrans approves the plan, within 5 years of license issuance PG&E proposes providing a sign conforming to Caltrans requirements for style and placement on State Highway 70 west of the pullout, informing travelers of the presence of the scenic viewpoint, and installing a visitor interpretation sign at the scenic viewpoint, near the Plumas National Forest boundary sign. Information provided on the visitor interpretation sign would likely include information on significant features visible from the scenic viewpoint and other features throughout the canyon and would be coordinated with similar interpretive sites provided at other locations in the canyon, including at Shady Rest. PG&E proposes maintaining the facility, with the exception of the Plumas National Forest boundary sign, through the term of the license.

In its preliminary section 10(a) recommendation no. 29A, the Forest Service recommends that, within 5 years of license issuance and contingent upon approval by Caltrans and receipt of authorization from the current landowner, as is necessary, PG&E pave a parking area for a scenic viewpoint on State Highway 70 at the existing Plumas National Forest boundary sign, just west of the boundary, provide a transition from the highway to the parking area, and install and maintain informational signage. The Forest Service recommends that PG&E install a sign on State Highway 70 in the eastbound direction, west of the scenic viewpoint, informing travelers of the presence of the overlook and also place informational signs at the overlook. The Forest Service recommends that PG&E also install, maintain, and replace, as necessary, approximately

50 square feet of informational signage. The Forest Service recommends that signage text would be submitted to the Forest Service for approval and would include information on significant features visible from the scenic viewpoint, and information on the canyon setting and engineering features that travelers would see as they travel through the canyon.

The Forest Service also recommends that information provided at this location be coordinated with information provided by PG&E at other locations in the canyon and that PG&E use materials, background, and text font similar to that used on other informational signs located in the canyon. The Forest Service recommends that PG&E be responsible for maintaining the paving and informational signs throughout the term of the license. The Forest Service recommends that PG&E's construction obligations under this condition be limited to paving an entrance to the new scenic viewpoint from the existing highway to a new parking area and installing the informational signs. The Forest Service recommends that PG&E may request an amendment to be relieved of this requirement if Caltrans imposes conditions for approval deemed to be cost ineffective by PG&E and the Forest Service. The Forest Service further recommends that PG&E's obligations under this recommendation be conditioned upon receipt of authorization from the current landowner to perform the construction activities and install the informational signs as described above. The Forest Service also recommends that PG&E not be required to condemn the land or accept any conditions for authorization imposed by the landowner that are deemed unacceptable to PG&E and the Forest Service. The Forest Service further recommends that within 6 months of completion of the scenic viewpoint, PG&E apply to the Commission to adjust the project boundary as needed to incorporate the new facilities.

Our Analysis

PG&E reported that 17 percent of the visitors surveyed at the State Highway 70 turnouts were sightseeing. As discussed in section V.C.6, *Land Use and Aesthetics*, State Highway 70 traverses the Feather River canyon, a steeply incised landform consisting of rock and granite walls that descend to the winding Feather River and encompasses a unique variety of natural and constructed landscape scenery. The Forest Service has officially designated a 130-mile segment of State Highway 70 as the Feather River National Scenic Byway, but views of the Poe bypassed reach from the byway are limited due to the canyon's steep terrain and intervening vegetation, as well as the varied distance between the highway and the river. According to the results of PG&E's recreation demand study, participation in sightseeing is expected to increase in the project area by 128 percent during the next 30 years. Providing a scenic viewpoint would increase the diversity of recreation experiences available in the Feather River canyon and the proposed location of the scenic viewpoint provides a view of Bardee's Bar along the Poe bypassed reach of the NFFR. Shady Rest, a highway rest stop located along State Highway 70, provides access to the NFFR, and a pleasant setting, but does not provide

the scenic vista available at the proposed scenic viewpoint. An informational sign at the scenic viewpoint could be used to inform project visitors about opportunities in the Feather River canyon, including those not accessible from State Highway 70. Improving ingress and egress to the site from State Highway 70 should help maintain highway safety in this area, particularly if the site is popular and use levels are high. Providing directional signs on State Highway 70 would inform potential project visitors of the existence of the scenic viewpoint and also contribute to maintenance of visitor safety. The Forest Service has pointed out that a limited number of safe turnouts are located along State Highway 70 and providing parking and interpretive information at this site would support and enhance sightseeing opportunities in this area. Therefore, a scenic viewpoint is needed along State Highway 70 to safely address user demand. The enhancements proposed by PG&E at this site would address user safety and the need to inform visitors of the recreational opportunities available in the Feather River canyon.

Visitors Center

PG&E proposes providing a one time contribution of seed money to a government agency or non-profit organization for possible development of a visitor center in the Feather River canyon, which would serve as a site for historic and prehistoric interpretation. PG&E proposes that there must be at least two other entities involved, but that the size of the matching grant would be negotiated. PG&E proposes that the seed money would revert back to PG&E if the government agency or non-profit organization responsible for development of the visitor center does not obtain matching seed money within 10 years of issuance of a project license. PG&E does not propose providing implementation, operation, or maintenance of any visitor center that may be developed.

In its preliminary section 10(a) recommendation no. 29H, the Forest Service recommends that within 3 years of license issuance, PG&E provide a one-time contribution of \$250,000 in matching grant funding for the construction of a visitor center by another party within the Feather River highway corridor. The Forest Service recommends that PG&E's funding obligation be contingent upon the availability of the entire \$250,000 in matching funds within 10 years of issuance of a new project license. The Forest Service recommends that if the entire \$250,000 in matching funds is not available within 10 years of issuance of a new project license, PG&E's obligation to provide matching funds would terminate. The Forest Service recommends that PG&E not be responsible for construction, operation, or maintenance of any visitor center that may ultimately be developed by a third party.

In its rationale document accompanying its preliminary 4(e) conditions and 10(a) recommendations, the Forest Service states that construction of a Visitor Center along the State Highway 70 corridor with the purpose of providing the public with interpretive, educational, and informational opportunities related to geologic, hydrologic, cultural, recreational, and engineering (hydropower) features found within the canyon has been a goal for a number of years. The Forest Service further states that limited opportunities

exist within the Feather River canyon, and specifically within the Poe Project area, for visitors to obtain information about features within the canyon. The Forest Service believes that construction of a visitor center would provide an opportunity for several agencies to work together to provide a wide variety of interpretive and educational opportunities to the public, school groups, and others, as well as general information for travelers through the area. The Forest Service points out that the Plumas National Forest Business Plan recommends development of a State Highway 70 Visitor Center in order to enhance public use and enjoyment of the area.

In his declaration attached to the September 19, 2006, comments filed by Butte County and American Whitewater, James Lenhoff, the current president of the Oroville Heritage Council, explains that following the completion of the Feather River Highway (State Highway 70) in 1937, the city of Oroville was known as the "Gateway to the Feather River Wonderland." Mr. Lenhoff explains that the railroad and the highway provided access to several great fishing opportunities, contributing to the thriving tourist industry in the Feather River canyon between 1910 and 1965. Mr. Lenhoff notes that tourism in the Feather River canyon has declined considerably since 1965. Attached to Mr. Lenhoff's declaration are copies of magazine and newspaper articles from the time when the Feather River canyon was a popular tourist destination; the articles and associated advertisements illustrate Mr. Lenhoff's declaration.

Our Analysis

We agree that there are currently limited opportunities to obtain visitor information in the Feather River canyon. Informational kiosks and public restrooms are located at Shady Rest, and further up the canyon at the Belden rest stop, but the ability of these sites to provide a wide variety of interpretive and educational opportunities to the public, school groups, and others, as well as general information for travelers through the area, is limited. It would be possible to provide these services at a visitor center in the Feather River canyon. As discussed in section V.C.6, *Land Use and Aesthetics*, State Highway 70 is the lowest route through the Sierra Nevada and provides year-round access to motorists. For this reason, many people traveling on State Highway 70 are on their way to a destination beyond the Feather River canyon and for them the canyon is not a destination in itself. We acknowledge the evidence that the Feather River canyon was once a popular tourist destination whose appeal began declining approximately 40 years ago, but it is unlikely that a visitor center would restore its popularity. Providing a Visitor Center would increase the number of visitor opportunities in the area, but is not needed to enhance visits to, or through, the Feather River canyon. The Poe Project is located at the entrance of the Feather River canyon and as such serves as the gateway to the canyon. However, the Poe Project encompasses only a small portion of the entire Feather River canyon.

Public Angling Access

In its April 11, 2005, filing, the Anglers Committee recommends that PG&E implement measures to improve and protect public angling, such as providing public parking, public rest rooms, and public hiking trails.

In its May 23, 2005, response to the Anglers Committee, PG&E points out that in its final license application for the Poe Project it proposed specific improvements related to public parking, restrooms, and trail access that were developed through a joint effort with the Forest Service, other regulatory agencies, and NGOs represented at the ongoing collaborative meetings.

Our Analysis

PG&E has proposed upgrading the parking areas, providing restroom facilities, and formalizing trails at three of the informal river access sites located in the Poe bypassed reach including Sandy Beach, Bardee's Bar, and the Poe powerhouse. PG&E reported that some visitors participated in fishing while visiting these sites. In addition, PG&E has proposed formalizing an access trail to Poe reservoir which would allow carrying of a canoe or other similar watercraft to the reservoir. This site has little use and informal parking would be provided on the existing turnout off of State Highway 70, west of the locked gate located on the road to the powerhouse. Providing access trails, parking, and restrooms would enhance the recreational experience of anglers visiting the Poe Project area. PG&E has not proposed any major developments or construction in the Poe Project area. Maintaining a primitive environment along the Poe bypassed reach should also preserve and protect the angling experience.

Law Enforcement and Safety

In its preliminary section 4(e) condition no. 30, the Forest Service specifies that PG&E provide \$12,000 to the Forest Service by March 1 of each year of the new project license, to assist in funding a river ranger position. The stated purpose of this position would be to provide additional light maintenance and visitor information and assistance, to maintain user safety, to collect information on recreation facility use, to conduct user surveys, to make use counts, and to perform Forest Protection Officer duties in the Poe Project bypassed reach and nearby reaches. The Forest Service further specifies that PG&E may request that the Forest Service provide it with a written summary of the previous year expenditures and River Ranger activities and the current year's planned expenditures and River Ranger activities by January 31 of each year during the term of the new license. The Forest Service specifies that funding for the river ranger position would be escalated starting in January 2006 based on the U.S. Gross Domestic Product-Implicit Price Deflator.

The Forest Service specifies that PG&E may request that the Forest Service combine funding provided under the Poe Project with that provided by PG&E under the Upper North Fork Feather River Project to more efficiently manage recreation use of the Feather River from Canyon dam to Big Bend dam.

In its April 11, 2005, filing, Butte County recommends, in recommendation no. 4H, that PG&E establish and undertake a cooperative program for management of recreational use, law enforcement, and emergency communication at project sites in cooperation with the Forest Service, Cal Fish and Game, CDBW, and Butte County, and that this program be subject to modification based on performance standards included in the plan. Butte County also recommends that PG&E enter into a Memorandum of Understanding with the Forest Service, Cal Fish and Game, CDPR, and Butte County to provide \$120,000 per year (2006 dollars) to fund one trained peace officer. Butte County recommends that PG&E provide the funding by March 1 of each year of the new project license. Butte County recommends that the position consist of a new employee or an appropriate combination of existing employees who would provide law enforcement services, including patrol, criminal investigations, and search and rescue. Butte County also recommends that PG&E cooperate with the Butte County Sheriff's Office to investigate, purchase, and install radio repeaters at appropriate locations to assist law enforcement and public safety personnel operating within the Feather River canyon.

In its May 23, 2005, response to Butte County, PG&E points out that its property taxes paid to Butte County already provide support for law enforcement and public safety. PG&E states that there is no indication in any data that there is a law enforcement problem in the project area and that public safety and law enforcement needs are not being met, based on the limited number of incidents reported in the project area. PG&E also points out that Butte County already receives economic benefit due to the Poe Project because PG&E pays substantial property taxes, and the project provides local jobs and low cost, clean, reliable energy to Butte County residents and other Californians. PG&E states, however, that the Forest Service specification for a river ranger position is reasonable and sufficient, considering the geographic scope of the project area and the existing and projected recreation use.

In its September 13, 2006, comments on the draft EA, Plumas County states it supports funding a river ranger in conjunction with similar funding for the UNFFR Project.

Our Analysis

The addition of a river ranger along the project bypassed reach could enhance the recreation experiences of some of the visitors to the Poe Project bypassed reach. The implementation of a seasonal position would likely increase visitor awareness of federal, state, county, and local regulations and laws. This increase in awareness could lead to an

increase in compliance with those laws and regulations and a greater degree of resource protection resulting from increased compliance. In addition, the position would provide opportunities to increase visitor satisfaction by helping to disseminate project information at various recreation facilities throughout the project area.

Law enforcement, however, at the Poe Project is the responsibility of the Forest Service and Butte County. The Forest Service is responsible for enforcing the natural resource protection provisions of the Plumas National Forest LRMP. Neither Butte County nor the Forest Service has provided any data to indicate the need for PG&E to fund a river ranger position to help patrol the Poe Project area. Security within the project development (powerhouse, dam, and switchyard), however, is the responsibility of PG&E.

No information exists on the record to indicate that law enforcement within the project area is inadequate, or that additional assistance is needed to complement the current levels of law enforcement. PG&E has stated that it believes that providing \$12,000 a year to the Forest Service to assist in funding a river ranger position is reasonable, which indicates that implementation of this specification by PG&E is likely. However, funding a river ranger position, as specified, provides no assurance that the river ranger would be used exclusively in the project area, in addition to the current levels of patrols in the project area. As such, there is no indication that the proposed measure would reduce any existing recreational conflicts or further protect project environmental resources for the term of the new license.

River Flow Information

In its preliminary section 4(e) condition no. 31, the Forest Service specifies that within 1 year of license issuance, PG&E make information on streamflow at gage NF-23 on the NFFR available to the public via a toll-free phone number and/or via the Internet. The Forest Service specifies that within 4 hours of collection of streamflow at gage NF-23, PG&E post the flow on the Internet site for the current and prior 6 days for the entire year. The Forest Service specifies that all streamflow values would be rounded to the nearest 100 cfs and plots or tables showing these data would be labeled, "*These provisional data have not been reviewed or edited and may be subject to significant change.*" The Forest Service further specifies that PG&E may, at its discretion but limited by its good faith (as defined in paragraph 1 of preliminary section 4(e) condition no. 24: honesty of purpose, free from intention to defraud, faithful to one's duty or obligation) intent to routinely and continuously provide this flow information, block the posting of this information when the information is determined by PG&E to have significant market value that may adversely affect PG&E bidding activities and power or ancillary service prices.

In their April 11, 2005, filing, the Boating Groups recommend that PG&E provide real-time flow information available via the Internet for the NFFR at the Pulga gage, and

flow information, both real time and forecasted, for the reach located downstream of the Poe powerhouse. The Boating Groups point out that this will assist boaters seeking boating opportunities through their personal analysis of real-time streamflow information via the Internet.

Our Analysis

The Forest Service has specified measures that would help provide a means to disseminate information regarding project area resources, facilities, and management issues to members of the public who currently use the project area and to members of the public who may be interested in using the area. This data dissemination also would improve public education concerning prevailing safety factors. Providing gage information for the Poe bypassed reach of the NFFR would provide the public with timely and specific flow information, minimizing some of the safety issues associated with flow levels.

Navigability of Project Reaches

In recommendation no. 4G of its April 11, 2005, filing, Butte County recommends that PG&E undertake measures to improve the navigability of the project reaches by conducting an inventory of the debris and other man-made modifications within the project boundaries that are risks to public health and safety. Butte County recommends that PG&E provide for the removal of the identified debris in cooperation with Caltrans and Union Pacific and with funds from its recommended North Fork Enhancement Fund. Butte County further recommends that PG&E remove any debris newly introduced into the project boundaries over the term of the license.

In its May 23, 2005, response to Butte County, PG&E points out that the only hazards reported during the whitewater boating study in the upper project reach (Sandy Beach to Bardee's Bar), were sleeper rocks¹¹ and a narrow channel width. PG&E also points out that the only hazards reported in the lower project reach (Bardee's Bar to the Poe powerhouse), were exposed boulders and submerged vegetation; no man-made obstacles were reported in either river reach. PG&E also states that its biological survey crews have not encountered any navigational hazards in the project reach and concludes that a further inventory of debris or man-made hazards is unnecessary.

Our Analysis

Studies conducted by PG&E indicate there is limited large woody debris in the Poe bypassed reach. During the controlled flow boating study, whitewater boaters

¹¹Rocks located just under the water surface in this section at the 495- and 800-cfs flow levels.

reported four potential hazards in the upper section of the Poe bypassed reach and 10 potential hazards in the lower section. PG&E proposed removing the existing steel bridge at Bardee's Bar, the only known man-made modification in the bypassed reach that is a risk to public health and safety. The existing record does not indicate that there is any man-made debris associated with the project through most of the bypassed reach and the primary hazards to navigation are natural (boulders, ledge). However, periodic monitoring of the Poe bypassed reach channel would determine if any debris from any construction activities has entered the channel, thus allowing removal of that debris before it becomes a safety hazard.

Recreational Flows

In recommendation no. 5 of its April 11, 2005, filing, Butte County recommends that PG&E implement the following flow schedule and operational requirements in the spring to enhance recreational use of the NFFR below Poe dam: in each wet and normal water year, PG&E would extend the last expected spill event of the spring runoff season at the Poe diversion a minimum of 8 days, resulting in flows at the Pulga gage between 800 and 1,500 cfs. During these extended-spill periods, the flow at the Pulga gage may be allowed to vary day-to-day within the specified range above, but would remain in a narrow range each day between 9:00 am and 5:00 pm.

In their April 11, 2005, filing, the Boating Groups recommend that PG&E implement the following flow schedule and operational requirements in the spring to enhance recreational use of the NFFR below Poe dam: once the NFFR is under the control of the Poe Project, implement a ramping rate of no more than 20 percent per day, resulting in a much more natural descending limb of the hydrograph. This would provide intermittent, but more predictable, whitewater opportunities following existing spills and may mitigate potential ecological effects on amphibians and salmonids due to the accelerated hydrograph recession pattern.

In its May 23, 2005, filing in response to Butte County and the Boating Groups, PG&E points out that spills occur in the Poe Reach in March, April, May, and June in wet and normal water years either because of heat spells causing very rapid snowmelt or because of rainstorms. PG&E also points out that weather predictions are rarely accurate beyond about 5 days, so there would be cases when future spills were expected but failed to occur if Butte County's recommended extension protocol were implemented. PG&E also points out that under the existing flow regime and using the historical record, 38 spill days occurred during the 8 normal water years that occurred, and the number of spill days ranged from 1 per year to 12 per year, with an average of almost 5 days per normal year. Under the existing flow regime and using the historical record, 65 spill days occurred during the 13 wet water years that occurred, and the number of spill days ranged from 1 per year to 15 per year with an average of 5 days per wet year. PG&E also points out that it has proposed to provide streamflow information so that whitewater boaters would know when the streamflow was in a range that was suitable for boating.

In its response to Butte County, PG&E also points out that prolonging high flows, especially in late spring, could be more damaging to FYLF egg masses than the short duration peaks typical of spills at Poe dam, so it cannot support the county's proposal.

In its response to the Boating Groups, PG&E states that the Boating Groups imply that the 20 percent per day ramp down would result in an ecological benefit. PG&E points out that the recommendation is not supported by any evidence. PG&E states that during wet years when spill extends into late June, FYLF breeding is delayed by high streamflow and cold water temperatures. PG&E notes that FYLF could benefit more from having spill stop 2 to 3 days after it reached 2,000 cfs rather than extended for the 9 days it would take to ramp the river down from 2,000 cfs to 268 cfs. PG&E also points out that the ramping rate recommended by the Boating Groups would be more effective in a meandering alluvial channel with bars, islands, and copious riparian vegetation rather than in the Poe bypassed reach, which has a predominantly granite channel.

In its response to Butte County and the Boating Groups, PG&E also states its belief that boating use levels in the Poe bypassed reach would be low, because there are so many other rivers in this region available for recreational whitewater boating during the spring, and many of those would be preferable to boaters over the Poe reach.

In recommendation no. 5 of its April 11, 2005, filing, Butte County further recommends that PG&E implement the following summer flow schedule and operational requirements to enhance recreational use of the NFFR below Poe dam: in all water years, PG&E would release recreational flows from Poe dam one weekend each month from June to October.

1. On release days when Lake Oroville is above an elevation of 800 feet msl, the flow release would be no less than 800 cfs and no more than 1,300 cfs. In any given year, 50 percent of these days would be between 1,000 and 1,200 cfs. Under this recommendation, PG&E would provide the flow release from 9:00 a.m. to 6:00 p.m. at the Pulga gage.
2. On release days when Lake Oroville is at and below an elevation of 800 feet msl, the recreational flow release would be no less than 1,500 cfs and no more than 2,500 cfs. In any given year, 50 percent of these days would be above 1,750 cfs. Under this recommendation, the flow release should be provided from 10:00 am until 6:00 pm at Bardee's Bar.
3. Ramping Rate: Each recreational flow schedule should be subject to any ramping rates prescribed in the project water quality certification and the Forest Service section 4(e) conditions.

In its April 11, 2005, filing, the Anglers Committee recommends that the Commission not approve out of season short-term whitewater fluctuating flows in the Poe bypassed reach of the NFFR. The Anglers Committee also states that CDWR, licensee

for the Oroville Project immediately downstream of the Poe Project, will most likely build a multi-million dollar whitewater park at the Oroville Project and consequently, there is no need to approve short-term fluctuating whitewater flows in the Poe reach of the NFFR.

In its May 23, 2005, filing in response to the Anglers Committee, PG&E points out that it has not proposed out of season whitewater flows. PG&E also points out that the ERC for the upstream Rock Creek-Cresta Project and PG&E have been evaluating the effects of short-term, out of season whitewater flows on fish, macroinvertebrates, and amphibians inhabiting the upstream Rock Creek-Cresta Project over the last 3 years. PG&E states that the results of studies conducted at the Rock Creek-Cresta Project during the flows and the results of other ongoing base flow monitoring will be used to assess effects of potential whitewater flows in the Poe reach in the future.

In comments on the draft EA, Butte County and American Whitewater state that they have consulted extensively with resource agencies, angling organizations, and PG&E, and have developed the following revised whitewater flow schedule:

1. Provide flow releases one weekend a month during July, August, September, and October;
2. Allow for a test period of flow releases (not less than 600 cfs) and volume (not more or less than 4,000 acre-feet per year, including ramping); the Forest Service would determine the length of the test period;
3. Conduct site-specific studies to monitor and assess any impacts to FYLF tadpoles resulting from: (A) the recreational boating flow schedule, and (B) project flow fluctuations; the resource agencies would develop the study protocols in consultation with PG&E, Butte County, and American Whitewater;
4. Monitor these releases, in consultation with Butte County and American Whitewater, to determine the acceptability of these initial flow levels for whitewater recreation, particularly since these flows are far below flows recommended in the controlled flow study conducted by PG&E;
5. The revised flow schedule is subject to amendment by: (A) an agreement between the resource agencies, Butte County, and American Whitewater, and (B) any necessary license amendment.

Our Analysis

The recommended recreational flow releases in the Poe bypassed reach would improve whitewater boater opportunities in the NFFR. As described in section V.C.1,

Water Resources, the Central Valley Regional Water Quality Control Board Basin Plan identifies water contact recreation, which includes whitewater activities such as rafting and canoeing as well as other activities such as wading and swimming, as one of the beneficial uses of the NFFR. Flows in the Poe bypassed reach at levels high enough for whitewater boating commonly occur only in the winter and spring months and are generally non-existent in August and September. A review of the current average flow data suggests that within the current flow regime there are 5 days of boatable flows in March; 3 days of boatable flows in January, February, April, and May; 2 days of boatable flows in June, November, and December; and just over 1 day in October. PG&E reported that the participants in the controlled flow study were unanimous in their desire to return to boat both the upper and lower sections of the Poe bypassed reach.

In its controlled flow study, PG&E provided flows of 495 cfs, 800 cfs, and 1,400 cfs in the 3.6-mile-long upper section of the Poe bypassed reach. None of the participants in the study rated any of the flows to be totally unacceptable and the 600 cfs test flow proposed by Butte County and American Whitewater falls within this acceptable range. However, “sleeper” rocks were located just under the water surface at the 495-cfs and 800-cfs flow levels so boaters would need to be made aware of these potential safety hazards. Boaters would be able to enjoy the wilderness appearance of this section with its waterfalls and rock walls.

PG&E provided flows of 495 cfs, 800 cfs, and 1,250 cfs in the 4.4-mile-long lower section of the Poe bypassed reach during its controlled flow study. Participants estimated that the minimum flow required to boat this section ranged from 500 to 1,200 cfs; again, the 600 cfs test flow proposed by Butte County and American Whitewater is within the acceptable range. However, safety is likely to be a greater issue in this section as exposed boulders were evident at both the 495-cfs and 800-cfs flows. Several rocks are also located just under the surface in this section, increasing the potential for hits and/or drags at 600 cfs. Aesthetically speaking, however, this highly scenic section would be enjoyed by boaters at the 600 cfs flow.

Monitoring these test flows, as recommended by Butte County and American Whitewater, would not only help verify the acceptability of these initial flow levels for whitewater recreation, but would provide information on the effects of recreation flows on other river recreation opportunities in the watershed, as well as on other resources.

Since 2002, PG&E has provided recreational flows to facilitate whitewater boating one weekend a month during the summer and early fall months (June – October) at the Rock Creek-Cresta Project, immediately upstream of the Poe Project. As part of the SA for the Rock Creek-Cresta Project, PG&E assigned recreation demand caps for the Rock Creek and Cresta reaches and agreed to count the number of boaters using the project reaches during scheduled recreational flows. PG&E agreed that once the recreation demand caps were met, it would provide additional flow release days. Conversely, if the recreation demand caps were not met, PG&E would reduce the number of recreational

flow release days. Whitewater boating demand for that portion of the NFFR has been high every year that PG&E has provided flows. The use estimates for these two reaches exceeded the recreation demand caps in 2002 and dropped only slightly in 2003 and 2004. Estimated use for 2005 exceeded the recreation demand caps for all months except June and July at the Rock Creek reach. See tables 31 and 32 for a comparison of estimated use and the recreation demand caps at the Rock Creek and Cresta reaches.

Table 31. Comparison of estimated boater use in 2005 to recreation demand caps for the Cresta reach. (Source: PG&E, 2005)

Month	Boater Days required to Trigger an Increase	Boater Days required to Trigger a Decrease	Estimated Actual Use	% Exceedance of 'Increase' Number	% Below 'Decrease' Number
June	60	40	NA	NA	NA
July	60	40	83	138	NA
August	80	50	214	268	NA
September	100	60	253	253	NA
October	100	60	155	155	NA

Table 32. Comparison of estimated boater use in 2005 to recreation demand caps for the Rock Creek reach. (Source: PG&E, 2005).

Month	Boater Days required to Trigger an Increase	Boater Days required to Trigger a Decrease	Estimated Actual Use	% Exceedance of 'Increase' Number	% Below 'Decrease' Number
June	120	60	47	NA	22
July	130	60	102	Within Range	Within Range
August	150	60	262	175	NA
September	180	80	251	139	NA
October	180	80	186	103	NA

Boater use of the Rock Creek-Cresta Project recreation flows demonstrates that a certain minimum level of scheduled recreation flows has societal value, but the marginal value of recreation flows diminished with each additional flow. We conclude that providing flows in the Poe bypassed reach would enhance recreational opportunities in this reach.

Finally, visitors to the Poe bypassed reach currently participate in swimming, wading, and angling. Any increase in flows from Poe dam would affect participants in these activities.

Recreation Fund

In recommendation no. 6 of its April 11, 2005, filing, Butte County recommends that PG&E establish and fund a trust fund called the “North Fork Feather Enhancement Fund,” to address possible unmitigated adverse effects on the beneficial uses of the NFFR. Butte County recommends that PG&E provide \$5,000,000 (2006 dollars) within 6 months of license issuance and \$500,000 per year (2006 dollars, subject to CPI adjustment), in each subsequent year during the term of the new license. Butte County recommends that PG&E adopt a trust instrument consistent with this recommendation. In item C of the recommendation, Butte County recommends that half of the initial contribution and each of the annual contributions be paid into a Recreation Account, which would be used for the enhancement of river recreation in the Feather River Basin or elsewhere in Butte County. Butte County recommends that the Recreation Account be subject to the governance above and any further regulatory approvals, and in coordination with related provisions in the new licenses for other projects in the Feather River Basin, the Recreation Account may be used to fund the following facilities, among others:

- An urban whitewater park below Lake Oroville;
- Feather River corridor facilities, which would include linkages from Lake Almanor to the Poe reach, such as coordinated trails or a shuttle service, a boating trail from Oroville dam to the confluence of the Feather River with the Sacramento River, consisting of appropriately spaced access and camping facilities;
- Trail access and boating tow services at the Bald Rock run of the Middle Fork Feather River near Lake Oroville;
- Improvements to Berry Road adjacent to Lake Oroville for boating access;
- Tow services below Big Bend dam to Dark Canyon on Lake Oroville;
- Feather River Visitor Center on Highway 70.

In its response to Butte County, PG&E states that the recreational proposals it included in the final license application were designed to meet the existing and future recreational use in the project area. PG&E points out that the Poe Project is very isolated

with limited current recreation use and few recreation opportunities to be developed, and according to its 2001 recreation needs analysis, visitors to the Poe Project have a strong preference for recreation locations that are undeveloped and primitive in nature. PG&E also states that the list of recreation facilities recommended by Butte County are not related to the Poe Project and are not within the project boundary, and therefore, are the responsibility of the county, not PG&E. PG&E also points out that the number of potential whitewater boaters estimated by Butte County is unreasonably high compared to actual boaters counted at the Rock Creek-Cresta Project. PG&E states that the number of potential boaters at the Poe reach would likely be much lower than the actual numbers at the Rock Creek-Cresta Project, due to poor road access to the Poe bypassed reach, a shorter, more difficult reach that only caters to elite boaters, and another short, average reach. PG&E also points out that the Commission uses current project conditions as the baseline for future analysis.

In their April 11, 2005, filing, the Boating Groups recommend that PG&E fund a trust in lieu of providing scheduled whitewater releases or shaping the rare spill events, since hydropower is valuable in dry and critically dry water years and spill flows are unlikely in the bypassed reach. The Boating Groups recommend that the annual contribution to this trust fund be based on the value of foregone generation and the number of whitewater boating days affected by project operations annually. The Boating Groups recommend that the trust fund be used for on-site and off-site mitigation of whitewater opportunities, including but not limited to shuttle services on Oroville reservoir, access site development, and development of other whitewater opportunities in the Feather River corridor.

In its response to the Boating Groups, PG&E points out that during dry and critically dry water years there may be a rare spill event. PG&E also points out that it plans to make streamflow information available to the public, so whitewater boaters would know when the streamflow was in a range suitable for boating. PG&E also notes that it is already providing whitewater boating opportunities during dry and critically dry water years at the Rock Creek-Cresta Project and encourages boaters to take advantage of that opportunity to boat.

Our Analysis

Butte County and the Boating Groups have provided a list of facilities and services they would like to see developed with their recommended funding from PG&E, including a Visitor Center. While a recreation fund and associated facilities and services may enhance visitor opportunities in the Feather River canyon and at Lake Oroville, we agree with PG&E's assessment that these facilities and services would not be related to the Poe Project, and would not be within the project boundary. As such, these recommendations do not have a clear nexus to the Poe Project.

We analyze the costs of measures proposed or recommended for recreational resources in section VI, *Developmental Analysis*, and make our final recommendations in section VII, *Comprehensive Development and Recommended Alternative*.

6. Land Use and Aesthetics

a. Affected Environment:

Land Use

There are currently 313 acres of land within the project boundary for the Poe Project; approximately 158 acres are owned by PG&E, approximately 144 acres are NFS lands of the Plumas National Forest, and approximately 12 acres are in private ownership. The project boundary encompasses the 1.7-mile-long Poe reservoir, the Poe dam and associated facilities, the 33,000-foot-long Poe tunnel and two adits, the Poe powerhouse and switchyard, and Forest Service Road 22N37 from its junction with Butte County Road 54545A. The upper end of Poe reservoir, the Poe tunnel, most of adit 1, and all of adit 2 are located on NFS lands; the lower end of the reservoir, the dam, and the powerhouse are located on PG&E land. Forest Service Road 22N37 is located primarily on PG&E land but parts of it are also on NFS land and on other private land.

PG&E proposes adding approximately 21 acres associated with the Big Bend dam and reservoir into the Poe Project boundary; PG&E owns approximately 20 acres of this land and the state of California owns the remaining acre. As discussed previously, Big Bend dam, which is currently within the Oroville project boundary, functions as an integral part of operations at the Poe Project, by providing the necessary tailwater elevation for the existing Francis turbines. The impoundment created by Big Bend dam also re-regulates river flows and discharge from the Poe powerhouse, reducing the magnitude of water elevation changes in the river channel downstream of the powerhouse and the dam. CDWR, in its September 18, 2006 comments on the draft EA, supported the inclusion of Big Bend dam in the Poe project boundary.

Additionally, PG&E proposes adding approximately 6 acres to the project boundary to encompass project recreational enhancements. With the inclusion of the land around Big Bend dam and the recreation areas, the new project boundary would encompass approximately 340 acres: approximately 182 acres owned by PG&E, approximately 145 acres of NFS land, approximately 12 acres of private land, and 1 acre of land owned by the state of California.

Management of the NFS lands within the Poe Project boundary is subject to the Plumas National Forest LRMP, which was finalized in 1988, and amended by the Sierra Nevada Forest Plan amendment in 2001. The Plumas National Forest LRMP encourages full development of the hydroelectric resource, as long as other resources and uses are not unacceptably impaired. The Plumas National Forest LRMP further recognizes that the

large-scale hydroelectric development on the NFFR is unique due to favorable hydro-topographic conditions. All of the Poe Project lands and lands influenced by project operations that are managed by the Plumas National Forest LRMP fall within one of three management areas designated by the LRMP: Flea Mountain, Grizzly Dome, and French Creek. The Flea Mountain management area encompasses the northwest side of Poe reservoir and dam, and the Grizzly Dome management area encompasses the southeast side of Poe reservoir and dam, and the north end of the Poe tunnel. The management direction for these two management areas includes maintaining pleasing visual corridors and minimizing the visual effect of the hydroelectric facilities on State Highway 70. Both of these management areas provide for recreational gold panning and dredging, but the standards and guidelines for both management areas recommend withdrawal of the NFFR from mineral entry, which means that gold panning and dredging may eventually be eliminated from these management areas. The French Creek management area encompasses the remainder of the Poe tunnel, the majority of adit 1, and adit 2. The management direction for this management area includes minimizing the visual effect of the hydroelectric facilities (USDA, 1988).

The Butte County General Plan presents goals and policies for private lands in the county, and serves as a basis for all decisions concerning land use in the county. Project lands located in Butte County and owned by private entities, including PG&E, are subject to the policies of the Butte County General Plan. The Butte County General Plan includes the Butte County zoning ordinances, which prescribe regulations governing land use through the establishment of land use zones, parcel sizes, and placement of structures within the county. Most of the private land within and adjacent to the project boundary is in timberland production zones, which are state-designated zones reserved for timber production and compatible uses. A small amount of the private land near the Big Bend dam and proposed for inclusion in the Poe Project boundary is designated as foothill area residential, with a minimum parcel size of 40 acres. The Butte County General Plan also includes standards for scenic highways and roads and State Highway 70 (Feather River Highway) is designated a scenic highway from the Butte County line to north of Pulga Road.

The major road in the vicinity of the Poe Project is State Highway 70, a two-lane paved roadway which parallels most of the Poe bypassed reach. Butte County Road 54545A (Bardee's Bar Road), located southeast of State Highway 70, is used to access adit 1. Access to the Poe powerhouse is via Forest Service Road 22N37, which extends from Bardee's Bar Road.

Aesthetics

The Poe Project is located in the Feather River canyon, on the NFFR in the Sierra Nevada Mountain foothills. The Feather River canyon, at an elevation of between 900 and 1,400 feet, is a steeply incised landform consisting of rock and granite walls that descend to the winding Feather River and encompasses a unique variety of natural and

constructed landscape scenery. State Highway 70, the lowest route through the Sierra Nevada, traverses the Feather River canyon and provides year-round access to motorists. Jarbo Gap and Pulga are two small rural communities located along the State Highway 70 corridor in the project vicinity, and the city of Oroville is approximately 20 miles southwest of the Poe Project on State Highway 70. There is virtually no pedestrian activity along State Highway 70 in the project vicinity, so potentially affected viewers of the project are motorists traveling through the canyon. Actual views of the Poe bypassed reach are sporadic and brief in duration due to the canyon's steep terrain and intervening vegetation, as well as the varied distance between the highway and the river.

Most of the Poe Project is located in the Plumas National Forest. The Plumas National Forest LRMP provides guidelines for the preferred Visual Quality Objectives of each management area. Objectives are based on the degree of acceptable alteration permitted within the natural characteristic landscapes and are applied to all project proposals and activities on NFS lands. The objectives prescribed by the Plumas National Forest LRMP for the NFS lands within the Poe Project boundary are retention, which provides for a natural-appearing landscape where management activities are not visually evident, and partial retention, which provides for a natural-appearing landscape by assuring that management activities remain visually subordinate to their natural landscape. The Forest Service does not prohibit the occurrence of any specific management activities on lands with prescribed Visual Quality Objectives of retention or partial retention.

In 1998, the Forest Service officially designated a 130-mile segment of State Highway 70, beginning about 8 miles north of the city of Oroville, as the Feather River National Scenic Byway. The Forest Service may consider adopting aesthetic guidelines, including a recommended color palette, for development improvements located within the scenic byway viewshed. The state of California has also designated portions of State Highway 70 in Butte and Plumas counties as an eligible scenic highway, and Butte County also designated portions of State Highway 70 north of Pulga Road as a scenic highway. The Poe Project is located adjacent to the section of State Highway 70 designated as scenic by the Forest Service, the state of California, and Butte County.

In order to evaluate the visual effects associated with the Poe Project, PG&E identified eight key viewpoints (KVPs) on public travel ways where project features are in view of the public. KVPs are often outside the project boundary and serve as a basis to assess project-related features in relation to the surrounding landscape. The assessment of project features from KVPs is summarized below.

1. State Highway 70 north of Poe dam (about 0.25 mile from the Poe dam and reservoir) – From this KVP, the reservoir and upper portion of the dam are partially screened by roadside vegetation seen in the foreground against a wooded hillside and mountain backdrop. The primary viewing group is roadway travelers.

2. State Highway 70 south of Poe dam (less than 0.25 mile from the Poe dam and reservoir) – From this KVP, the reservoir and upper portion of the dam are partially screened by roadside vegetation seen in the foreground with forested slopes in the distance. The primary viewing group is roadway travelers.
3. Shoreline at Poe dam (less than 0.125 mile from the Poe dam and reservoir) – From this KVP, the dam structure is seen prominently against a forested hillside backdrop and the reservoir and shoreline appear in the foreground. The primary viewing group is roadway travelers.
4. State Highway 70 at pullout above Bardee’s Bar (0.5 mile from the spoil pile) - From this KVP, the rail corridor line is seen above the exposed embankment and partially vegetated slope with a portion of the NFFR visible below in the foreground. The primary viewing group is roadway travelers.
5. State Highway 70 at pullout north of Jarbo Gap (0.5 mile from the spoil pile) – From this KVP, foreground vegetation partially screens the forested hillside and mountain backdrop. The exposed embankment and a portion of the rail corridor are seen in the middleground. The primary viewing group is roadway travelers.
6. Access road to Bardee’s Bar (0.25 mile from the spoil pile) – From this KVP, the river, rocky shore, and an abandoned bridge dominate the foreground. The rail corridor is seen above a meadow and a sparsely vegetated, exposed rock embankment is in the middleground. The primary viewing group is recreationists.
7. Powerhouse access road (less than 0.25 mile from the Poe powerhouse and ancillary equipment) – From this KVP, foreground views encompass water and forested slopes. The powerhouse and associated structures are also prominent in the foreground. The primary viewing group is recreationists.
8. Shoreline at Poe powerhouse (less than 0.125 mile from the Poe powerhouse and ancillary equipment) – From this KVP, forested slopes dominate the foreground and middleground views. Powerhouse equipment is also prominent in the foreground. The primary viewing group is recreationists.

PG&E also conducted a visual resources technical study focused on three components of the Poe Project: the reservoir, the dam, and the powerhouse. PG&E noted that the Poe Project also includes a concrete-lined pressure tunnel that extends about 33,000 feet and a steel underground penstock that is about 1,000 feet in length; however, these components are generally below grade and consequently not visible to the public so they were not addressed in the project visual effects evaluation. However,

PG&E did address the spoil pile located near Bardee's Bar, which is the result of construction of the project pressure tunnel.

Poe Reservoir: Poe reservoir extends for about 1.7 miles to a point just below the Cresta powerhouse. The natural-appearing reservoir is long and narrow with a maximum width of about 400 feet near the dam and about 150 feet at its upper end. Under normal operations, the water surface elevation fluctuates a total of 11 feet. During most of the year, outside of the winter and spring high runoff periods, the reservoir fluctuates daily about 3 feet in elevation.

Poe Dam: Poe dam is about 400 feet across with a maximum height of 60 feet. A bridge with pole mounted light fixtures spans the top of the dam; the bridge is supported by five concrete piers. Water is released downstream through four radial flood gates that are approximately 50 feet wide by 40 feet high in addition to a smaller 20 foot by 7 foot radial gate. Other structures at the dam include a low concrete control building situated beneath the bridge, chain link fencing along the east shore, and a sign and fenced gate located along the edge of State Highway 70. The dam is located on NFS lands.

Portions of the Poe dam can be seen by motorists traveling north and south along State Highway 70. Although partially screened by vegetation, the dam is a visible foreground and middleground element for southbound motorists. However, these views are brief and usually last no more than several seconds. A fleeting and partially screened foreground view of the dam can be seen from northbound Highway 70 and brief foreground views of the fenced gate situated along the roadside are also available from State Highway 70. The fence and gate also appear to contrast with the surrounding vegetation in terms of form and color.

Poe Powerhouse: Poe powerhouse is a steel frame, reinforced concrete structure which is 114 feet wide by 175 feet long. The powerhouse is located on PG&E land at an elevation of 900 feet. Adjacent to the powerhouse on the north, and enclosed by chain link fencing, are two transformers, two small tanks, and several ancillary structures.

Poe powerhouse is not generally visible from most of the KVPs due to screening provided by intervening vegetation and topography. However, the powerhouse is a visually prominent foreground element as seen from the access road and the shoreline at the powerhouse site (KVPs 7 and 8). From the access road, views tend to focus away from the powerhouse, toward the water and distant forested hillside and mountain scenery, even though portions of the powerhouse are seen in the foreground. From the beach, the powerhouse appears as a relatively large scale industrial structure seen against a wooded backdrop. Because a relatively small number of viewers visit the site, and because views from the access road and the beach tend to focus away from the powerhouse and toward the river and scenic canyon landscape, the visual effects of the powerhouse are not considered to be substantial.

Spoil Pile at Bardee's Bar: The spoil pile at Bardee's Bar is the result of construction of the project pressure tunnel and is visible from State Highway 70, some locations along secondary public roadways, and from the Bardee's Bar area (KVP 6). The spoil pile is visible only briefly and intermittently by motorists traveling along approximately 1 mile of State Highway 70 north of Jarbo Gap, but longer duration views of the spoil pile are possible from the pullout above Bardee's Bar (KVP 4) and the pullout north of Jarbo Gap (KVP 5). From State Highway 70, the appearance of the spoil pile contrasts with the surrounding landscape in terms of line, color, and texture.

b. Environmental Effects:

Land Use

Big Bend Dam

Although Big Bend dam was constructed in 1908 to divert NFFR flows three miles downstream to a powerhouse for hydroelectric generation, this function ended with the filling of Lake Oroville, which inundated the powerhouse. Today, Big Bend dam supports Poe project operations by maintaining a suitable tailwater elevation for operation of the powerhouse's Francis turbines, and by maintaining Big Bend reservoir, which re-regulates river flows and discharge from the Poe powerhouse, reducing the magnitude of water elevation changes in the river channel downstream of the powerhouse and the dam.

Discharge from the Poe powerhouse can rapidly fluctuate with changes of about 3,700 cfs occurring over ten minutes, which, if unregulated, would likely affect downstream riverine biota through displacement, stranding, and habitat alteration and could constrain angling and cause public safety concerns. The presence of the impoundment allows these fluctuations to be dampened. A notch cut in the dam in the 1960s allows PG&E to better manage flows downstream of the dam, and to minimize the effects of changing operations at Poe powerhouse. On July 25, 2001, PG&E tested the dampening effect of the dam by monitoring river stage levels upstream and downstream of the dam while bringing the Poe powerhouse to full-load. The results of this test indicate that the dam has a moderate influence on river stage downstream of the dam as a result of this re-regulating effect. Incorporation of Big Bend dam and associated lands into the Poe project boundary would ensure that these project purposes can be maintained through the term of any new license issued for the project.

Road Use and Management

In its preliminary section 4(e) condition no. 9, the Forest Service specified that the Forest Service would have unrestricted use of any road within the project area for all purposes deemed necessary and desirable in connection with the protection,

administration, management, and utilization of NFS lands or resources, and that the Forest Service would have the right to extend rights and privileges of use of such roads to state and local subdivisions thereof, as well as to other users, including members of the public, except contractors, agents, and employees of PG&E, provided that the agency having jurisdiction would control such use so as not to unreasonably interfere with safety or security uses, or cause PG&E to bear a share of the costs of maintenance greater than PG&E's use bears to all use of the road.

In its preliminary section 4(e) condition no. 10, the Forest Service specified that PG&E confine all project vehicles, including, but not limited to, administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Road Management Plan referred to in its preliminary section 4(e) condition no. 40. The Forest Service reserved the right to close any and all such routes where damage is occurring to the soil or vegetation, or, if requested by PG&E, to require reconstruction/construction by PG&E to the extent needed to accommodate PG&E's use. The Forest Service agreed to provide notice to PG&E and the Commission prior to road closures, except in an emergency, in which case notice would be provided as soon as practicable.

In its May 23, 2005, response to the Forest Service, PG&E stated that the Forest Service had exceeded its authority under section 4(e) of the FPA in its preliminary 4(e) condition nos. 9 and 10 and on December 19, 2005, PG&E proposed alternative conditions to the Forest Service's preliminary section 4(e) condition nos. 9 and 10. PG&E's alternative condition no. 9 would limit the United States to unrestricted use only of any road over which it has jurisdiction within the project area, and PG&E's alternative condition no. 10 would confine all project vehicles to roads or specifically designed access routes, as identified in the road management and maintenance plan, only when on NFS lands within the Poe Project boundary.

On September 26, 2006, the Forest Service filed its final section 4(e) conditions nos. 9 and 10, which include revisions to the original language mutually agreed to by the Forest Service and PG&E. The Forest Service has modified its section 4(e) condition no. 9 to specify that it would have unrestricted use of any road over which PG&E has control in the project area, rather than the original language which provided the Forest Service with unrestricted use of any road within the project area. The Forest Service further clarifies final section 4(e) condition no. 9 by specifying that the United States would only have the right to extend rights and privileges for the use of the right-of-way and road thereon to the states and others "when needed for the protection, administration, and management of federal lands or resources." The Forest Service has modified its section 4(e) condition no. 10 to specify that PG&E would only confine vehicles being used for project purposes to specifically designated access routes as identified in the road management plan.

On September 29, 2006, PG&E withdrew its alternative conditions to the Forest Service's preliminary section 4(e) condition nos. 9 and 10, stating that it was satisfied with the revisions made by the Forest Service in the final section 4(e) conditions.

In its preliminary section 4(e) condition no. 40, the Forest Service specifies that within 1 year of license issuance, PG&E file a Forest Service-approved road management plan addressing all Forest Service and unclassified roads required by PG&E to access the project area. The Forest Service specifies that the road management plan for the Poe Project include (1) identification of all Forest Service roads and unclassified roads on NFS lands needed for project access, including road numbers; (2) a map showing all Forest Service roads and unclassified roads on NFS lands used for project access, including digital spatial data accurate to within 40 feet, identifying each road by Forest Service road number; (3) a description of each Forest Service road segment and unclassified road on NFS lands needed for project access, including termini, length, purpose and use, party responsible for maintenance, level of maintenance, structures accessed, location and status of gates and barricades, if any, ownership of road segment and underlying property, instrument of authorization for road use, and assessment of road conditions; and (4) provisions requiring PG&E to consult with the Forest Service in advance of performing any road construction, realignment, or closure involving Forest Service roads or lands. The Forest Service specifies that PG&E prepare a condition survey and a proposed maintenance plan subject to annual Forest Service approval, beginning the first full year after the road management plan has been approved.

The Forest Service further specifies that PG&E obtain appropriate authorization (e.g., special-use permit, road-use permit, or maintenance agreement) in accordance with the road management plan for all project access roads under Forest Service jurisdiction that are located outside the project boundary, including unclassified roads and Forest Service system roads needed for project access; the term of the authorization would be the same as the term of the license. The Forest Service specifies that PG&E enter into the appropriate authorization mechanism with the Forest Service that supersedes the existing authorization with the Forest Service. The road management plan would identify PG&E's responsibilities for road maintenance and repair costs commensurate with PG&E's use and other project-induced use. The Forest Service specifies that the road management plan identify road maintenance and management standards that provide for traffic safety; minimize erosion and damage to natural resources, and are acceptable to the Forest Service. The Forest Service further specifies that PG&E be responsible for any new construction, realignment, closure, or other road management actions PG&E proposes in the future, subject to Forest Service standards in effect at the time, including related studies, analyses or reviews required by Forest Service.

The Forest Service specifies that as an alternative to preparing a road management plan, PG&E may request that the Forest Service incorporate project roads located on NFS lands into the existing Forest Service and PG&E Road Use Agreement dated

May 22, 1997. This agreement includes a list of roads covered by the agreement (Forest Service System roads jointly used by PG&E and the Forest Service), levels of road maintenance, road maintenance specifications, and methods to fulfill maintenance obligations. The Forest Service points out that a segment of the access road to the Poe powerhouse crossing NFS lands is not included in the Forest Service and PG&E Road Use Agreement that includes PG&E-used roads on other projects. If the request is accepted by the Forest Service, the Forest Service recommends that PG&E file the Road Use Agreement with the Commission in lieu of the Road Management Plan.

Our Analysis

Forest Service 4(e) conditions 9 and 10 are included in the Forest Service's list of standardized 4(e) license conditions that are applied to hydroelectric projects on NFS lands to meet the applicable laws and regulations. The Forest Service has included these conditions because the Poe Project affects resource conditions and functions on NFS lands administered by the Forest Service.

Forest Service Road 22N37 is not included in the existing road maintenance agreement between the Forest Service and PG&E. Additionally, PG&E projects an increase in recreation use at the project over the year 2001 levels. An increase in users, as well as the passage of time, would likely warrant additional road rehabilitation to help ensure that the capacity of the roads is not exceeded and to maintain the roadways to current traffic service and maintenance levels. According to the road maintenance agreement, PG&E and the Forest Service meet annually to develop an annual maintenance plan that addresses all anticipated road maintenance work needed on the roads covered by the road maintenance agreement. Inclusion of Forest Service Road 22N37 in the existing road maintenance agreement would assure comparable maintenance of that road, which is included in the project boundary.

The road management plan recommended by the Forest Service differs slightly from the road maintenance agreement PG&E has developed with the Forest Service. Development of a road management plan would require minimal changes to the existing road maintenance agreement, as well as development of digital spatial data accurate to within 40 feet, identifying each road by Forest Service road number. This should improve the utility of the information.

Fire Prevention, Response, and Investigation

In its preliminary section 4(e) condition no. 8A, the Forest Service specifies that within 1 year of license issuance, PG&E file a Forest Service-approved fire prevention and response plan with the Commission, which would be developed in consultation with the appropriate state and local fire agencies. The fire prevention and response plan would detail PG&E's responsibility for the prevention (excluding fuel treatment as described in

preliminary section 4(e) condition no. 32), reporting, control, and extinguishing of fires in the vicinity of the project. The Forest Service specifies that the plan address the following categories, at a minimum: fuels treatment and vegetation management; prevention, including the availability of fire access roads, community road escape routes, and helispots, and addressing fire danger associated with project induced recreation; emergency response preparedness; reporting of any fires to the Forest Service within 24 hours; and extinguishing and controlling fires.

The Forest Service further specifies that the plan include appropriate measures from the fuel treatment plan and that any fire prevention measures conform to the water quality protection practices as enumerated in the U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, Water Quality Management for NFS Lands in California- Best Management Practices.

In its preliminary section 4(e) condition no. 8B, the Forest Service specified that PG&E agree to fully cooperate with the Forest Service on all fire investigations and produce for the Forest Service upon request all materials and witnesses over which PG&E has control that are related to the fire and its investigation, including all investigation reports, all witness statements, all photographs, all drawings, all analysis of cause and origin, and all other, similar materials and documents regardless of how collected or maintained. The Forest Service further specified that PG&E preserve all physical evidence and give the Forest Service custody of all physical evidence requested.

On December 19, 2005, PG&E proposed an alternative condition to the Forest Service's preliminary section 4(e) condition no. 8A. In its alternative condition, PG&E proposes that the fire prevention and response plan specified by the Forest Service would set forth, in detail, its responsibility for the prevention, reporting, control, and extinguishing of fires only on NFS lands within the project boundary, rather than for all fires in the vicinity of the project. PG&E suggests this alternative condition to limit the scope of the plan and asserts that section 4(e) conditions do not extend to non-NFS lands or to NFS lands outside the boundaries of a licensed project. PG&E states that the Forest Service's preliminary section 4(e) condition no. 8A is unreasonable because it would make PG&E responsible for preventing, controlling, and extinguishing fires it did not cause on lands outside of the Poe Project boundary and for which it has no responsibility.

PG&E also proposed an alternative condition to the Forest Service's preliminary section 4(e) condition no. 8B. In its alternative condition PG&E proposes to agree to cooperate with the Forest Service on all fire investigations only to the same extent and in the same manner as the Forest Service cooperates with PG&E on such investigations, rather than agreeing to cooperate on all fire investigations. In its alternative condition PG&E also proposes to produce, upon request only, those materials not subject to the attorney-client or attorney-work product privileges, rather than all materials over which it has control. In its alternative condition PG&E also proposes that it not be obligated to

give custody of any physical evidence to the Forest Service, if the Forest Service fails to provide PG&E with reasonable access to the physical evidence, documents, and other materials that PG&E, in its reasonable discretion, determines it requires in order to defend any and all claims against it that arise from a fire within the project boundaries.

On September 26, 2006, the Forest Service filed its final section 4(e) condition no. 8, which includes revisions to the original language mutually agreed to by the Forest Service and PG&E. Preliminary section 4(e) condition nos. 8A and 8B are no longer subdivided; specifications for each condition are included in final section 4(e) condition no. 8. In addition to the language included in its preliminary section 4(e) condition nos. 8A and 8B, the Forest Service specifies in its final section 4(e) condition no. 8 that it would provide PG&E with reasonable access to the physical evidence and documents that PG&E requires in order to defend any and all claims which may result from a fire resulting from project operations, to the extent such access is not precluded by ongoing criminal or civil litigation.

On September 29, 2006, PG&E withdrew its alternative conditions to the Forest Service's preliminary section 4(e) condition nos. 8A and 8B, stating that it was satisfied with the revisions made by the Forest Service in its final section 4(e) condition no. 8.

In its preliminary section 4(e) condition no. 32, the Forest Service specifies that, within 1 year of license issuance, PG&E file a Forest Service-approved fuel treatment plan with the Commission, for the purpose of identifying hazardous vegetative conditions surrounding project facilities that may accelerate the spread of a wildfire onto NFS lands as a result of PG&E activities, or might place project facilities in jeopardy from an approaching fire. The Forest Service specifies that, at a minimum, the plan include provisions for (1) analysis of live and dead fuel loading and potential fire behavior within 300 feet of project features; (2) treatments to be employed to reduce the hazard; (3) an implementation schedule; and (4) provisions for the reassessment of hazard at 5 to 8 year intervals, depending on regrowth of vegetation. The Forest Service specifies that it would approve treatments extending onto adjacent NFS lands. The Forest Service further specifies that PG&E coordinate implementation and accomplishment of hazard reduction activities with those of the Forest Service, when practicable.

Our Analysis

The Forest Service points out that the Poe Project facilities are located in a forested setting with heavy live and dead fuels and that two wildland fires burned PG&E lands near the Poe powerhouse in 2001. Continued hydroelectric operations, along with the presence of project facilities such as generators and construction equipment, contribute to fire danger in the project area. Over the term of a new license, the number of recreational users is expected to increase at most developed project sites and dispersed recreation areas with user-created fire rings add to the threat of fires in the area.

Additional fires within the project area would most likely result in property damage, destruction to the scenic beauty of the Feather River canyon, increased particulate matter and decreased air quality due to smoke, and possibly loss of life. Development of a fuel treatment plan to manage currently untreated fuels in the project boundary would reduce the risk of a catastrophic fire.

Development of a fire prevention and response plan enables a coordinated approach to preventing fires and responding to fires that could start in the vicinity of applicant-owned facilities. Having a fire management and response plan with fire prevention and response strategies would help minimize damage to natural resources and increase preparedness of fire personnel to provide for public safety when future fires occur. A fire management and response plan would enable compilation of information from the various agencies working together to reduce future fire danger in the project area and would facilitate fire prevention needs and procedures within the project boundary and throughout the project area. Formalizing any existing agreements would improve the efficiency and effectiveness of fire management in the project area.

Aesthetics

Poe Dam and Bardee's Bar Spoil Pile

PG&E proposes to implement the following measures to reduce the visual contrast between the Poe dam and the surrounding landscape, as seen from State Highway 70:

- Paint the light standards and fixtures situated on top of the dam a shade of medium brown, or other suitable color, so as to appear less evident in relationship to the forest backdrop.
- Paint the gate and metal pole/chain link enclosure a medium to dark brown, or other suitable color, so as to appear less noticeable against the vegetation backdrop.

PG&E also proposes to implement either one or both of the following measures in order to reduce the apparent visual contrast between the spoil pile and the surrounding landscape, particularly as seen from State Highway 70:

- Stain the exposed embankment to closely match the colors of the nearby exposed rock.
- Install revegetation of the embankment using a grass/shrub mixture, to blend in with vegetation cover on the immediately adjacent hillside.

In its preliminary section 4(e) condition no. 33, the Forest Service specifies that, within 1 year of license issuance, PG&E file with the Commission a Forest Service-

approved Bardee's Bar tunnel spoil revegetation plan identifying measures to revegetate the spoil pile. The Forest Service specifies that PG&E include the following in the plan: a schedule for implementation, a description of site preparation and planting techniques, the number of planting sites, the plant species to be established, and a listing of follow-up measures to ensure success. The Forest Service also specifies that PG&E include in the plan an evaluation of the stability of the undercut concrete features located at the foot of the spoil pile, as well as a schedule for stabilization or removal of undercut concrete from the stream channel. The Forest Service specifies that PG&E coordinate the Bardee's Bar tunnel spoil revegetation with the removal of the Bardee's Bar bridge and obliteration of the bridge access roads as described in preliminary section 4(e) condition no. 29.

In its preliminary section 4(e) condition no. 39, the Forest Service specifies that PG&E file a Forest Service-approved visual management plan with the Commission within 60 days prior to any ground-disturbing activities on NFS lands. The Forest Service specifies that this plan would, at a minimum, address:

- clearings, spoil piles, and project facilities such as diversion structures, penstocks, pipes, ditches, powerhouses, other buildings, transmission lines, corridors and access roads;
- facility configurations, alignments, building materials, colors, landscaping, and screening;
- a proposed mitigation and implementation schedule necessary to bring project facilities into compliance with the National Forest LRMP direction;
- locating road spoil piles either in approved areas on NFS lands or in a location off of NFS lands;
- removing all visible non-native materials, including construction debris, from the surfaces of piles located on NFS lands; and
- stabilizing and revegetating all native material that is allowed to be left on NFS lands, including complying with visual quality objectives.

Our Analysis

As the Forest Service points out, the existing project facilities and operations are clearly visible on the landscape with buildings, dams, and penstocks contrasting sharply with the surrounding forested setting. Project roads and appurtenant facilities also are obvious to the casual observer. In addition, PG&E's hydroelectric facilities require periodic painting, light to heavy maintenance, and upgrading to meet current operational standards and to maintain aesthetic appeal. PG&E already has proposed painting the light standards and fixtures situated on top of the Poe dam, as well as the gate and metal

pole/chain link enclosure at the Poe dam. Consulting with the Forest Service on color selection for these activities and when any other maintenance or repair work is scheduled at the project facilities would assure that the LRMP standards are addressed.

The Forest Service points out that the toe of the Bardee's Bar tunnel spoil pile extends to within 20 to 30 feet of the NFFR low flow channel. The Forest Service believes that gunnite was placed at the toe of the tunnel spoil pile by the Union Pacific Railroad after the 1997 flood, but the gunnite has subsequently been undermined, leaving a steep cut face near the bottom of the spoil pile. The Forest Service points out that in some places, the gunnite overhangs the stream channel. The Forest Service also points out that the Bardee's Bar tunnel spoil pile and associated bridge access are highly visible from both State Highway 70 and Bardee's Bar Road and do not meet the Forest Service Visual Quality Objectives. PG&E has proposed staining the exposed embankment of the Bardee's Bar spoil pile to closely match the colors of the nearby exposed rock. The Forest Service has expressed its skepticism with this proposal and states that revegetation of at least a portion of the site is more desirable.

Establishing native plantings on the Bardee's Bar spoil pile would reduce the visual contrast of the spoil pile with its surroundings and cause the spoil pile to blend in with the vegetation in the vicinity of the pile. The Bardee's Bar tunnel spoil revegetation plan should address monitoring the spoil pile following revegetation and include alternative measures for reducing the visual contrast of the spoil pile if revegetation is unsuccessful.

We analyze the costs of measures proposed or recommended for land use and aesthetic resources in section VI, *Developmental Analysis*, and make our final recommendations in section VII, *Comprehensive Development and Recommended Alternative*.

c. Unavoidable Adverse Effects:

None.

7. Cultural Resources

a. Affected Environment:

Identification of the Area of Potential Effect and Consultation

The area of potential effects (APE) for the project is defined as including the following areas: (1) Poe reservoir, dam, and intake structure; (2) access roads or trails to adit one, adit two, the surge chamber, and Poe powerhouse; (3) areas around tunnel adits; (4) Poe surge chamber and two penstocks; (5) Poe powerhouse and switchyard; (6) the Big Bend dam and area impounded between the dam and the Poe powerhouse tailrace;

and (7) areas of proposed recreation development at Poe and Sandy Beaches and Bardee's Bar. PG&E requested concurrence with the APE from the California State Historic Preservation Officer (SHPO) by letter dated December 3, 2004. Historic properties are defined as buildings, structures, areas, objects, and traditional cultural properties that are listed or eligible for listing on the National Register.

Archaeological Research

Human occupation in the project area dates to slightly before 1000 BC. Archaeological investigations associated with the construction of the Oroville dam in the 1960s identified a chronological sequence consisting of four distinct time periods: (1) the Mesilla Complex (before 1000 BC to AD1) featuring assemblages indicative of seasonal occupation in the foothills, including milling stone and mano, stone bowl mortars and pestles and large, leaf-shaped and wide-stemmed projectile points of basalt and shale; (2) the Bidwell Complex (AD1 to AD 800) marked by assemblages and features indicative of semi-permanent village including milling stone and mano, steatite vessels for cooking, net and line sinkers, and both large and small stemmed and corner-notched projectile points; (3) the Sweetwater Complex (AD 800-AD1600) with assemblages and features indicative of permanent settlements, including the appearance of bone and shell artifacts, bedrock mortars, and smaller Rose Spring and Gunther points marking the introduction of the bow and arrow; and (4) the Oroville Complex (AD 1600 to AD 1850) marked by larger structures such as the "dance house," increasing numbers of imported items (beads and ornaments), and the use of cryptocrystalline materials for the manufacture of tools and projectile points. The Oroville Complex is denoted by Cottonwood triangular and Desert side-notched points.

The project reservoir, dam, and intake structure areas were previously surveyed in 1983 (Baker and Shoup, as cited in PAR, 2001) and 1987 (Maniery and Maniery, as cited in PAR, 2001), and the project dam access road and a portion of the northern end of the project tunnel were surveyed in 1987 (Maniery and Maniery). These studies identified four prehistoric archaeological sites within the Poe project's APE. These include CA-BUT-994, CA-BUT-1009, CA-BUT-1010, and CA-BUT-1016.

Between August 31, 1999, and April 2000, PG&E conducted cultural resource studies of areas not previously investigated. These areas included the following: (1) access roads or trails to adit nos. 1 and 2, the surge chamber, and the Poe powerhouse; (2) areas around tunnel adits; (3) Poe powerhouse and switchyard; (4) Big Bend dam and the area impounded between it and the Poe powerhouse tailrace; and (5) areas of proposed recreation development at Poe and Sandy beaches and Bardee's Bar. Additionally, PG&E attempted to relocate and update the site records for the four previously recorded sites and another earlier recorded site, CA-BUT-42/H.

The surveys conducted by PG&E identified five new sites (CA-BUT-1665H, CA-BUT-1666, CA-BUT-1667, CA-BUT-1668, and CA-BUT-1669) and relocated two of the

previously recorded sites (CA-BUT-42/H and CA-BUT-1016) (PAR, 2001). Two archaeological sites, CA-BUT-42/H and CA-BUT-1665H, meet the criteria for listing in the National Register.

Site CA-BUT-42H consists of two granite milling stones with large, intact subsurface deposits that have the potential to yield data helpful in understanding regional prehistory. Site CA-BUT-1665H is a multi-component site with eight granite features including acorn cracking cups that has the potential to yield data helpful in understanding regional prehistory. Specifically, the site affords an opportunity to further an ongoing research domain in California focused on the characterization and use of acorn cracking cups.

The remaining five archaeological sites all have suffered disturbance from ongoing flooding that has limited their potential to yield useful new information. Therefore, they would not meet the National Register criteria. PG&E has requested SHPO concurrence on these National Register eligibility recommendations. In the absence of any written concurrence from the SHPO, we will consider these two sites as eligible in our effects analysis.

Ethnographic Research

The project area is the ancestral home of the Northwestern Maidu, a Konkow-speaking people. The Konkow territory extended from portions of the Sacramento Valley near Chico eastward and southward to the lower Feather River region near Oroville, as well as to the lower reaches of the North, South, and Middle Forks of the Feather River. The Konkows that lived in the project area resided in permanent village communities including large semi-subterranean communal structures and small conically shaped, bark covered, dwellings, located along ridge tops or on small mid-slope terraces above the rivers. They followed a yearly cycle of hunting small and large game common to the area in the winters, and fishing and gathering seeds, berries, and acorns (a primary staple in their diet) in the springtime. A major malaria epidemic in 1833 decimated the population of Konkow in the Sacramento Valley and resulted in a severe population decline in the foothill and mountain regions. At present, several Konkow families still live in the canyon as well as in the Oroville and Chico areas.

PG&E has not conducted ethnographic surveys for the Poe Project. PG&E provided information about the relicensing process, the project vicinity, project maps, summary of cultural resources located in the APE, and proposed protection and enhancement measures to the Berry Creek Rancheria, Enterprise Rancheria, and Mooretown Rancheria in December 2000. A representative of the Mooretown Rancheria indicated that the Concow Band of Maidu should be the primary contact for PG&E as the Poe Project is located within their ancestral territory. PG&E provided the same set of project-related information to the Chairperson of the Concow Band of Maidu on August 3, 2003, and a follow-up letter initiating consultation with the ConCow Band of Maidu on

August 10, 2003. Copies of the draft license application were provided to all four entities on August 21, 2003. No written comments were received. No traditional cultural properties have been identified within the project's APE.¹²

Historical Research

Euro American contact in the project area began with Spanish explorers in 1808 and continued with trappers and miners during the mid-19th century gold rush. Early industry consisted of mining, followed by ranching and agriculture. Because of the harsh terrain, the area remained relatively isolated until the early 20th century, when the Western Pacific Railroad was built (1905-1910). Transportation opened the area up to tourism and fishing, and vacationing along the North Fork of the Feather River became fashionable in the 1910 to 1930s.

Hydroelectric development began in the area in 1908 when the Plumas Plant (Big Bend) was constructed to generate hydroelectric power. Paved highways in 1942 opened up all areas of the canyon to tourism and hydroelectric power industries. PG&E received a license to build the Poe Project in 1953. The Big Bend Project was decommissioned in 1967, after construction of the Oroville Project. The powerhouse was flooded, but the dam continues to serve as a necessary feature for the Poe powerhouse.

PG&E assessed the National Register eligibility of Big Bend dam and concluded that it does not meet the criteria because it has lost its integrity of design and context, was not unusual for its time, is not associated with significant persons, does not embody distinctive architectural or engineering characteristics, and is not likely to yield any important new information (PAR, 1999). By letter dated December 3, 2004, PG&E requested SHPO concurrence that Big Bend dam does not meet the National Register criteria. We reviewed the documentation provided by PG&E on the evaluation of Big Bend dam and agree that the property does not meet the criteria for listing in the National Register.

¹²On January 12, 2006, Commission staff circulated a draft programmatic agreement (PA) and PG&E's Cultural Resources Inventory and Management Plan (CRIMP) to the Greenville Rancheria, Berry Creek Rancheria, Enterprise Rancheria, Mooretown Rancheria, Mechoopda Indian Tribe, and Concow band of Maidu, requesting comments on the draft PA and PG&E's recommendations for managing cultural resources. On February 3, 2006, we received a signature from the Greenville Rancheria concurring in the PA, and comments from the Mechoopda Indian Tribe expressing concerns about the PG&E's recommendations for managing cultural resources (see our analysis in the following section).

b. Environmental Effects:

Effects on historic properties (properties eligible or listed on the National Register) within the APE can include, but are not limited to, inundation under the waters of project reservoirs, the recreational use of the reservoirs and other project lands, vandalism, and modifications or repairs to project facilities. The type and level of effects on cultural resources can vary widely, depending on site location and setting, features and attributes, visibility of the resources, and public knowledge and access to a resource. For our analysis, we consider the effects of continued project operation and the implementation of proposed environmental enhancements on the two known historic properties (CA-BUT-42H and CA-BUT-1665H) and on potential unanticipated discoveries and human remains.

PG&E proposes to install one picnic table at the informal recreation area at Bardee's Bar and to provide signage, one seasonal portable toilet, a trash receptacle, grade the access road, and define the existing parking area with boulders at the informal recreation area at Sandy Beach. PG&E proposes to locate any new recreational facilities away from the areas of known historic properties and to monitor these properties annually in the fall after the recreation season for 5 years following the issuance of any license. The need for additional monitoring would be evaluated after the first 5 years of monitoring. PG&E also prepared an HPMP that (1) recommends additional research at CA-BUT-42H if any ground-disturbing activities are proposed within or adjacent to the site; (2) indicates that proposed recreational improvements would not be placed within the CA-BUT-1665H site boundaries, but recommends annual monitoring of the site to deter graffiti and vandalism, and further research if any ground-disturbing activities are proposed within or adjacent to the site; and (3) provides procedures for handling accidental discoveries and human remains.

Forest Service preliminary condition no. 29 specifies that PG&E prepare a Recreation Enhancement, Construction, and Implementation Plan that would include provisions to improve and expand recreational facilities at the Plumas National Forest entrance and scenic viewpoint, Poe Beach, Sandy Beach, and Bardee's Bar. Improvements at Bardee's Bar would include new signage, a picnic table, vault toilet, and trash receptacle. Improvements at Sandy Beach would include new signage on Highway 70 (subject to Caltrans approval), paving the access road, two portable toilets, trash receptacles, and a hardened trail or stairway from the beach areas to the parking area.

Forest Service preliminary condition no. 34 specifies that PG&E should do the following: (1) file an HPMP approved by the Forest Service for the purpose of protecting and interpreting heritage resources; (2) consult with the SHPO, Native American Tribes, Forest Service, and other applicable agencies and communities during the preparation of the plan; and (3) incorporate the HPMP into a PA of which the Forest Service will be a signatory. Forest Service further stipulates that the HPMP shall accurately define the APE, including the effects of implementing section 4(e) conditions, and take into account

project effects on National Register properties, Native American traditional cultural values, and project effects on archaeological properties on NFS lands; and provide measures to mitigate identified effects, a monitoring program, and management protocols for the ongoing protection of archaeological properties.

In addition to the HPMP, Forest Service preliminary condition no. 34 also specifies that if prior to, or during, ground-disturbing activities, or as a result of project operations, items of potential cultural, historical, archaeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on NFS lands and licensee adjoining fee title property, PG&E shall immediately cease work in the affected area, notify Forest Service, and shall not resume ground-disturbing activities until appropriate evaluation of the find has been completed and PG&E has received written approval from Forest Service. Forest Service may require PG&E to perform recovery, excavation, and preservation of the site and its artifacts at PG&E's own expense through provisions of an Archaeological Resources Protection Act permit issued by the Forest Service.

Our Analysis

Recreational Enhancements

The primary threat to known historic properties in the project area is the expansion of recreational facilities and activities at Bardee's Bar and Sandy Beach, as the historic properties are located in the vicinity of these recreational areas. The Bardee's Bar informal recreation area is relatively isolated, and visitation at this location is low. PG&E's proposal to install one picnic table located away from the historic property, would recognize existing use while attracting visitors away from the historic property. Forest Service preliminary condition no. 29 includes additional enhancements at this location that could affect the historic property depending on the location and the additional visitation that improved facilities might attract to the area.

Implementation of PG&E proposed measures and the improvements stipulated by Forest Service at Sandy Beach have the potential to affect CA-BUT-1665H. Better demarcation of parking and locating recreation facilities away from the historic property, as proposed by PG&E, would attract visitors away from the historic property and help to minimize potential effects.

The Cultural Resources Inventory and Management Plan (CRIMP) prepared by PG&E (PAR, 2001) and as stipulated by the Forest Service provides for further investigation at CA-BUT-42H and CA-BUT-1665H if any ground-disturbing activities take place within or adjacent to these sites, consistent with Forest Service preliminary condition no. 34. Coordination in the preparation of a final HPMP and recreation plan to specify placement of all new facilities away from the known historic properties, and construction drawings that depict the areas to be avoided during construction, would

minimize potential effects to the historic properties and eliminate the need for further subsurface investigations. The results of the proposed monitoring of the sites would allow PG&E to determine if placement of facilities away from the site discourages vandalism, and if not, to re-evaluate what measures might need to be implemented to protect the site.

There are no known historic properties located in the vicinity of the other recreation areas and improvements proposed by PG&E or stipulated by the Forest Service. However, the potential for unanticipated discoveries, including human remains, exists. The CRIMP prepared by PG&E includes provisions to cease work and notify a PG&E archaeologist should ground-disturbing activities uncover cultural resources or human remains.

Historic Properties Management Plan

We issued a draft PA along with PG&E's CRIMP on January 12, 2006. Our intention was to execute the PA and implement the CRIMP upon issuance of a new license for the project. The existing CRIMP provides avoidance strategies for CA-BUT-42H and CA-BUT-1665H and general procedures for handling unanticipated discoveries and human remains. However, we anticipate that the implementation of the Recreation Enhancement, Construction, and Implementation Plan will warrant further coordination between the Forest Service and PG&E to avoid adverse effects to CA-BUT-42H and CA-BUT-1665H, along with any unanticipated discovery that may occur during ground disturbing activities. Furthermore, in their preliminary condition no. 34, the Forest Service specifies that PG&E would craft a final HPMP that would be coordinated with the Recreation Enhancement, Construction and Implementation Plan, and both plans would be implemented after license issuance. In response to issuance of our draft PA for review and comment, we have also received comments from the Mechoopda Indian Tribe involving their concerns with PG&E's recommendations for monitoring CA-BUT-42H and CA-BUT-1665H only once a year, and a number of other issues involving management measures and protocols associated with the CRIMP (Mechoopta Indian Tribe letter to FERC, dated February 17, 2006). In their comments, the Mechoopta point out that there is a lack of specific procedural measures and protocols in the existing CRIMP.

We analyze the costs of measures proposed or recommended for cultural resources in section VI, *Developmental Analysis*, and make our final recommendations in section VII, *Comprehensive Development and Recommended Alternative*.

c. Unavoidable Adverse Effects:

None.

D. NO-ACTION ALTERNATIVE

Under the No-action Alternative, PG&E would continue to operate the Poe Project under the terms and conditions of the current license. The environmental measures proposed by PG&E and recommended by staff would not be implemented, although the existing mitigation measures would continue. These measures would essentially maintain the natural resources of the NFFR in a “status quo” condition, with some potential for improvement of recreational resources as facilities are maintained or upgraded.

VI. DEVELOPMENTAL ANALYSIS

In this section, we analyze the project’s use of the water resources of the NFFR to generate power, estimate the economic benefits of the Poe Project, and estimate the cost of various environmental protection and enhancement measures and the effects of these measures on project operations.

Under its approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶61,027, July 13, 1995), the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. The Commission’s economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project-generated power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

For our economic analysis of alternatives, we used the assumptions, values, and sources shown in table 33.

A. POWER AND ECONOMIC BENEFITS OF THE PROPOSED PROJECT

As proposed by PG&E, the Poe Project would generate an average of 563,798,000 kWh of electricity annually, have an annual power value of \$31,685,450 (56.20 mills/kWh) and total annual costs of \$7,445,670 (13.21 mills/kWh), resulting in a net annual benefit of \$24,239,780 (42.99 mills/kWh).

B. POWER AND ECONOMIC BENEFITS OF THE STAFF-RECOMMENDED ALTERNATIVE

Resource agencies and NGOs recommended implementing a variety of measures at the project. Staff reviewed each recommendation and determined the measures that were most appropriate for implementation.

Table 33. Staff assumptions for economic analysis of the Poe Project. (Source: PG&E as modified by staff, and staff)

Assumption	Value	Source
Energy value (2005\$)	56.20 mills/kWh	PG&E
Capacity value (2005\$)	Included in energy value	
Cost of debt	6.61 percent	PG&E
Return on project equity	11.21 percent	PG&E/staff
Bond/Debt ratio	0.48	PG&E
Overall cost of money	9 percent	PG&E
Discount rate	9 percent	PG&E
State and federal income tax rate	34 percent	Staff
Local tax rate	3 percent	Staff
Insurance rate	0.25 percent of initial net investment	Staff
Term of financing	20 years	Staff
Period of analysis	30 years	Staff
Escalation rate after 2005	0 percent	Staff
Net investment (2005\$)	\$30,030,520	PG&E/staff
Operation and maintenance costs (2005\$)	\$2,817,350	PG&E/staff
No-action average annual generation (kWh)	582,600,000	PG&E
No-action dependable capacity (kW)	120,000	PG&E

As recommended by staff, the Poe Project would generate an average of 553,053,000 kWh of electricity annually, have an annual power value of \$31,081,580 (56.20 mills/kWh) and total annual costs of \$7,584,270 (13.71 mills/kWh), resulting in a net annual benefit of \$23,497,310 (42.49 mills/kWh).

Table 34 compares the power value, annual costs, and net benefits for the no-action alternative, PG&E's proposal, PG&E's proposal with additional staff-adopted measures, and the proposed action with additional staff-adopted and mandatory measures for the Poe Project. Based on our environmental analysis, we do not recommend all of the section 4(e) mandatory terms and conditions filed by the Forest Service. However, any license issued may include those terms and conditions, so we show the economic information for that alternative. Table 35 shows the effect on costs and power values of individual measures proposed by PG&E and stipulated and recommended by staff and

others, including the additional measures that staff has adopted. In section VII, *Comprehensive Development and Recommended Alternative*, we discuss our reasons for recommending the staff alternative and why we believe the environmental benefits are worth these costs.

C. POWER AND ECONOMIC BENEFITS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative, the Poe Project would generate an average of 582,600,000 kWh of electricity annually, have an annual power value of \$32,742,120 (56.20 mills/kWh), and total annual costs of \$7,185,890 (12.33 mills/kWh), resulting in a net annual benefit of \$25,556,230 (43.87 mills/kWh).

Table 34. Summary of the annual net benefits for PG&E’s proposed action, PG&E’s proposed action with additional staff-adopted measures, the proposed action with additional staff-adopted and mandatory measures, and the no-action alternative for the Poe Project. (Source: Staff)

	PG&E’s Proposed Action	Proposed Action with Additional Staff-adopted Measures	Proposed Action with Additional Staff-adopted and Mandatory Measures	No Action
Installed capacity (MW) ^a	142.83	142.83	142.83	142.83
Annual generation (kWh)	563,798,000	553,053,000	531,370,000	582,600,000
Annual power value (mills/kWh)	\$31,685,450 (56.20)	\$31,081,580 (56.20)	\$29,862,770 (56.20)	\$32,742,120 (56.20)
Annual cost (mills/kWh)	\$7,445,670 (13.21)	\$7,584,270 (13.71)	\$7,596,080 (14.30)	\$7,185,890 (12.33)
Annual net benefit (mills/kWh)	\$24,239,780 (42.99)	\$23,497,310 (42.49)	\$22,266,690 (41.90)	\$25,556,230 (43.87)

^a The authorized installed capacity is currently 142.83 MW per the current license issued on October 26, 1953. The capacity was based solely on the generator capacity. The Commission’s current regulations (18 CFR 11.1[i]) define the authorized capacity as follows:
“...the authorized installed capacity means the lesser of the ratings of the generator or turbine units.”
For the Poe Project, the generator capacity is 142.83 (158,700 kVA x 0.90 kW/kVA = 142,830 kW, or 142.83 MW), and the turbine capacity is 114.0 MW (152,000 hp x 0.75 kW/hp = 114,000 kW, or 114.0 MW). Therefore, the authorized capacity of the project should be 114.0 MW.

Table 35. Summary of capital costs, annual costs, annual energy costs, and total annualized costs of environmental measures proposed by PG&E and recommended or specified by staff and others for the Poe Project. (Source: PG&E as modified by staff, and staff)

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
Water Resource Measures							
1. Develop a water temperature maintenance, moderation and monitoring plan (Interior 10(j) recommendation no. 2(a), Forest Service, 10(a) recommendation no. 24(3), CDFG 10(j) recommendation no. 3)	Interior, Forest Service, CDFG	\$15,000	\$0	\$0	\$2,180	No	a, b, c
2. Implement actions to meet the water temperature moderation criteria range program (Interior 10(j) recommendation no. 2(b), Forest Service 10(a) recommendation no. 24(3), CDFG 10(j) recommendation no. 4)	Interior, Forest Service, CDFG	\$150,000	\$50,000	\$899,200	\$971,020	No	a, c
3. Implement summer water temperature monitoring at seven pre-existing water quality stations in the Poe bypassed reach	Staff	\$0	\$50,000	\$0	\$50,000	Yes	a

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
Aquatic Resource Measures							
4. Implement minimum instream flow regime of 150 cfs (PG&E, as described in license application)	PG&E	\$0	\$0	\$1,056,560	\$1,056,560	No	d
5. Implement a variable minimum instream flow regime (Forest Service preliminary 4(e) condition no. 24(1))	Forest Service	\$0	\$0	\$2,866,200	\$2,866,200	No	a, e
6. Implement a variable minimum instream flow regime (Interior 10(j) recommendation no. 1(a), CDFG 10(j) recommendation no. 1 – as revised by comments on the draft EA to reflect October 2005 flow proposal)	Interior, Forest Service, CDFG, Butte County	\$0	\$0	\$3,529,360	\$3,529,360	No	a
7. Implement a variable minimum instream flow (staff alternative)	Staff	\$0	\$0	\$1,639,920	\$1,639,920	Yes	a
8. Forecast water year type (Interior 10(a) recommendation no. 3, Forest Service preliminary 4(e) condition no. 25)	Interior, Forest Service, staff	\$0	Negligible	\$0	\$0	Yes	a, e
9. Develop a streamflow gaging management plan in consultation with resource agencies and file the plan with the Commission (Interior 10(j) recommendation no. 4 and 1(c))	Interior, staff	\$10,000	\$0	\$0	\$1,450	Yes	a, b

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
10. Operate and maintain existing gage NF-23 (Interior 10(j) recommendation no. 1(c), Forest Service preliminary 4(e) condition no. 24(4))	PG&E, Interior, Forest Service, staff	\$0	\$1,000	\$0	\$1,000	Yes	a, e
11. Implement the streamflow gaging management plan (Interior 10(j) recommendation no. 1(c), Forest Service preliminary 4(e) condition no. 24(4))	Interior, Forest Service, staff	\$0	\$1,000	\$0	\$1,000	Yes	a, e
12. Within 1 year of license issuance, develop and file a pulse flow monitoring plan to assess the magnitude and duration of pulse flows needed to effectively remove fine-grained sediment from spawning gravels in the Poe bypassed reach.	Staff	\$50,000	\$0	\$0	\$7,270	Yes	a
13. Implement a 12 hour, 2,000 cfs pulse flow in water years classified as dry or critically dry (Interior 10(j) recommendation no. 1(b), Forest Service preliminary 4(e) condition no. 24(2)(A))	Interior, Forest Service, Butte County	\$0	\$0	\$13,040	\$13,040	No	a, e

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
14. Implement a 72-hour, 2,000 cfs pulse flow in water years classified as dry or critically dry (CDFG 10(j) recommendation no. 2)	CDFG	\$0	\$0	\$39,120	\$39,120	No	a
15. Implement a 24 hour, 2,000 cfs pulse flow in water years classified as dry or critically dry	Staff	\$0	\$0	\$20,510	\$20,510	Yes	a
16. Develop a plan to evaluate the effects of scheduled minimum instream flows on fish and wildlife resources (Interior 10(j) recommendation no. 1(c), CDFG 10(j) recommendation no. 7)	Interior, CDFG, staff	\$7,500	\$0	\$0	\$1,090	Yes	a, b
17. Develop and implement a plan to evaluate the movement of organic and fine-grained sediment resulting from scheduled pulse flow releases (Interior 10(j) recommendation no. 1(c), Forest Service preliminary 4(e) condition no. 24(2)(B))	Interior, Forest Service, staff	\$2,000	\$15,000	\$0	\$15,290	Yes	a, b, e

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
18. Within 1 year of license issuance, develop and submit a ramping rate plan for the Poe bypassed reach (Interior 10(j) recommendation no. 3, Forest Service preliminary 4(e) condition no. 24(5), and CDFG 10(j) recommendation no. 6)	Interior, Forest Service, CDFG, staff	\$20,000	\$0	\$0	\$2,910	Yes	a, b, e
19. Within 60 days of license issuance, implement ramping rates as described in the license application	PG&E	\$102,200	\$0	\$100	\$14,980	No	d
20. Implement interim ramping rates as recommended by Interior and the Forest Service (Interior 10(j) recommendation no. 3, Forest Service preliminary 4(e) condition no. 24(5))	Interior, Forest Service, staff	\$102,200	\$0	\$100	\$14,980	Yes	d, e
21. Within 1 year of license issuance, develop and implement a fisheries monitoring plan (Interior 10(j) recommendation no. 7(a))	Interior	\$4,500	\$21,530	\$0	\$22,180	No	a, b, f
22. Within 1 year of license issuance, develop and implement a fisheries monitoring plan (Forest Service preliminary 4(e) condition no. 28)	Forest Service	\$4,500	\$9,470	\$0	\$10,120	No	a, b, e, g

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
23. Within 1 year of license issuance, develop and implement a fisheries monitoring plan	Staff	\$4,500	\$14,610	\$0	\$15,260	Yes	a, b, h
24. Within 1 year of license issuance, develop and implement a macroinvertebrate monitoring plan (Interior 10(j) recommendation no. 7(d))	Interior	\$4,500	\$14,350	\$0	\$15,000	No	a, b, i
25. Within 1 year of license issuance, develop and implement a macroinvertebrate monitoring plan (Forest Service preliminary 4(e) condition no. 28)	Forest Service	\$4,500	\$6,320	\$0	\$6,970	No	a, b, e, j
26. Within 1 year of license issuance, develop and implement a macroinvertebrate monitoring plan	Staff	\$4,500	\$9,740	\$0	\$10,390	Yes	a, b, k
27. Evaluation of Poe Reach Biological Monitoring program (Interior 10(j) recommendation no. 7(e))	Interior	\$4,500	\$0	\$0	\$650	No	a

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
28. Assessment of rainbow trout access to Poe tributaries (Interior 10(j) recommendation no. 7(b), Forest Service final 4(e) condition no. 24(6) [initially designated as preliminary 4(e) condition no. 27], and CDFG 10(j) recommendation no. 5)	Interior, Forest Service, CDFG, Butte County, staff	\$0	\$20,000	\$0	\$20,000	Yes	a, e
29. As an alternative to 4(e) condition no. 27, eliminate the condition and use existing information on rainbow trout access to tributary streams (PG&E alternative 4(e) condition 27)	PG&E	\$0	\$0	\$0	\$0	No	l
30. Implement a fish passage feasibility study for the Poe Project (Interior 10(j) recommendation no. 9)	Interior	\$50,000	\$0	\$0	\$7,270	No	a
31. Replace fish passage facility at Big Bend dam	Butte County	\$8,176,000	\$76,650	\$0	\$1,266,010	No	a
32. Conduct a feasibility study of removal of Big Bend dam	Butte County	\$10,000	\$0	\$0	\$1,450	No	a
33. Provide spawning gravel supplementation for the Poe bypassed reach	Butte County	\$7,500	\$25,000	\$0	\$26,090	No	a

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
34. Establish and fund a “Fisheries Account” as part of a “North Fork Feather Enhancement Fund” to be used for enhancement of anadromous and other coldwater fisheries in the Feather River Basin and elsewhere in Butte County	Butte County	\$2,500,000	\$250,000	\$0	\$613,670	No	m
Terrestrial Resources Measures							
35. Monitor the responses of habitat characteristics (e.g. water temperature) and affected resources (e.g., fish, amphibians, macroinvertebrates, bald eagles, and riparian vegetation) to changes in minimum streamflow	PG&E	\$7,500	\$10,000	\$0	\$11,090	No	a
36. Conduct surveys for sensitive wildlife species and coordinate with resource agencies for protection of these species if additional activities that could affect sensitive species should occur in the project area (Forest Service preliminary 4(e) condition no. 36)	PG&E, Forest Service, staff	Unknown	\$0	\$0	\$0	Yes	a, e
37. Develop and implement an amphibian monitoring plan (Interior 10(j) recommendation no. 7(c))	Interior, staff	\$3,000	\$12,500	\$0	\$12,940	Yes	a, b

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
38. Develop and implement an amphibian monitoring plan (Forest Service preliminary 4(e) condition no. 28)	Forest Service	\$3,000	\$7,160	\$0	\$7,600	No	a, b, e, n
39. Annually review the list of special status species and consult with the Forest Service to determine if study plans are needed for new species, and survey areas within the project boundary with known special status species' habitat or occurrences every 10 years. (Forest Service preliminary 4(e) condition no. 35)	Forest Service	\$0	\$1,490	\$0	\$1,490	No	a, o
40. As an alternative to preliminary 4(e) condition no. 35, annually review the list of special status species and consult with the Forest Service to determine if study plans are needed for new species and survey areas on Forest Service lands with known special status species habitat or occurrences every 10 years (PG&E alternative 4(e) condition no. 35)	PG&E	\$0	\$1,490	\$0	\$1,490	No	a, l o

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
41. Annually review the list of special status species and consult with the Forest Service to determine if study plans are needed for newly listed species, and survey areas within National Forest System lands to determine possible project effects on newly listed species. (Forest Service final 4(e) condition no. 35)	Forest Service, staff	\$0	\$1,490	\$0	\$1,490	Yes	a, e, o
42. Implement a noxious weed control program on project lands	PG&E	\$0	\$5,000	\$0	\$5,000	No	p
43. Prepare and implement an invasive weed management plan for PG&E and Forest Service lands. (Forest Service preliminary 4(e) condition no. 37)	Forest Service	\$50,000	\$25,000	\$0	\$32,270	No	a, b
44. As an alternative to preliminary 4(e) condition no. 37, prepare and implement an invasive weed management plan for Forest Service lands within the project boundary to control noxious weeds (PG&E alternative 4(e) condition no. 37)	PG&E	\$30,000	\$15,000	\$0	\$19,360	No	a, l

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
45. Prepare and implement an invasive weed management plan for lands within the project boundary and adjacent to project features directly affecting National Forest System lands. (Forest Service final 4(e) condition no. 37)	Forest Service, staff	\$50,000	\$25,000	\$0	\$32,270	Yes	a, b, e
46. Develop and implement a riparian monitoring plan, including surveys in years 1-4 and at intervals to be determined in subsequent years to that to determine the effects on riparian vegetation from changes in flows	Staff	\$15,000	\$8,310	\$0	\$10,490	Yes	a, b, q
Threatened and Endangered Species Measures							
47. Implement the Poe powerhouse Bald Eagle Management Plan, including revised recommendations	PG&E	\$5,000	\$5,000	\$0	\$5,730	No	a
48. Within 6 months of license issuance, update the Bald Eagle Management Plan and implement it within 1 year of license issuance (Interior 10(j) recommendation no. 6)	Interior, staff	\$5,000	\$5,000	\$0	\$5,730	Yes	a, b

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
49. Within 90 days of license issuance, review and update the Bald Eagle Management Plan in consultation with the Forest Service and other resource agencies and file it for Commission approval within 2 years of license issuance (Forest Service preliminary 4(e) condition no. 38)	Forest Service	\$5,000	\$5,000	\$0	\$5,730	No	a, b, e
Recreational Resources Measures							
50. Within 1 year of license issuance, prepare a recreation management plan in consultation with appropriate federal, state and local agencies and file with the Commission for approval (Interior 10(j) recommendation no. 8, Forest Service preliminary 4(e) condition no. 29)	Interior, Forest Service, Butte County, staff	\$10,000	\$0	\$0	\$1,450	Yes	a, b, e

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
51. Within 1 year of license issuance, improve an existing trail running from the west end of the informal parking area at Cresta powerhouse to a small sandy beach located on Poe reservoir and install and maintain informational, regulatory and directional signs at the site (Forest Service 10(a) recommendation no. 29(D))	PG&E, Forest Service	\$28,620	\$1,020	\$0	\$5,180	No	d
52. Construct and maintain recreational facilities in the vicinity of the Cresta powerhouse, including moving an existing gate and installing a new gate	Butte County	\$84,000	\$10,000	\$0	\$22,220	No	a
53. Within 2 years of license issuance, provide recreational enhancements at Sandy Beach	PG&E, staff	\$28,620	\$5,310	\$0	\$9,470	Yes	d
54. Provide recreational enhancements at Sandy Beach, including two restrooms (Forest Service preliminary 4(e) condition no. 29(E))	Forest Service, Butte County	\$53,000	\$6,000	\$0	\$13,710	No	a, e

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
55. Within 2 years of license issuance, provide recreational enhancements at Bardee's Bar (Forest Service 10(a) recommendation no. 29(F))	PG&E, Forest Service, staff	\$55,190	\$9,200	\$0	\$17,230	Yes	d
56. Remove the Bardee's Bar bridge (Forest Service 10(a) recommendation no. 29(G))	PG&E, Forest Service, Butte County, staff	\$459,900	\$0	\$0	\$66,900	Yes	d
57. Provide recreational enhancements at Bardee's Bar, including additional picnic tables and fire rings, and road maintenance as necessary	Butte County	\$2,610,000	\$15,000	\$0	\$394,680	No	a, r
58. Modify an existing abandoned construction road to an all-weather hiking trail between Bardee's Bar and an improved scenic point downstream of the State Highway 70 bridge	Butte County	\$530,000	\$2,000	\$0	\$ 79,100	Not at this time, pending feasibility study	s
59. Improve an existing 2.8-mile-long abandoned trail between Bardee's Bar and the Poe powerhouse road	Michael F. Taylor	\$50,000	\$2,000	\$0	\$9,270	Not at this time, pending feasibility study	a

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
60. Conduct a feasibility study on improving an existing abandoned trail between Bardee's Bar and the Poe powerhouse road	Staff	\$10,000	\$0	\$0	\$1,450	Yes	a
61. Construct and maintain a 3-mile-long trail between Bardee's Bar and Poe Beach	Butte County	\$9,560,000	\$10,000	\$0	\$1,400,690	No	t
62. Within 2 years of license issuance, provide recreational enhancements at Poe Beach (Forest Service preliminary 4(e) condition no. 29(C))	PG&E, Forest Service, staff	\$39,860	\$310	\$0	\$6,110	Yes	d, e
63. Provide recreational enhancements at Poe Beach including a trail along the east side of the NFFR channel and directional signs for boaters	Butte County	\$20,000	\$2,500	\$0	\$5,410	No	a
64. Within 2 years of license issuance, provide recreational enhancements at the Poe powerhouse (Forest Service 10(a) recommendation no. 29(B))	PG&E, Forest Service, staff	\$61,320	\$8,580	\$0	\$17,500	Yes	d

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
65. Provide recreational enhancements at the Poe powerhouse, including additional parking and a trail on the east side of the NFFR	Butte County	\$80,000	\$10,000	\$0	\$21,640	No	a
66. Within 5 years of license issuance, construct a scenic viewpoint at a pullout on State Highway 70 just west of the Plumas National Forest boundary (Forest Service 10(a) recommendation no. 29(A))	PG&E, Forest Service, staff	\$38,840	\$1,020	\$0	\$6,670	Yes	d
67. Provide a one-time contribution of seed money to a government agency or non-profit organization for possible development of a visitor center in the Feather River canyon (Forest Service 10(a) recommendation no. 29(H))	PG&E, Forest Service	\$250,000	\$0	\$0	\$36,370	No	u
68. Improve and protect public parking, public rest rooms, and public hiking trails for anglers	Anglers Committee, staff	\$0	\$0	\$0	\$0	Yes	v
69. Provide annual funding to the Forest Service for a river ranger position (Forest Service preliminary 4(e) condition no. 30)	Forest Service	\$0	\$12,000	\$0	\$12,000	No	e

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
70. Establish and maintain a cooperative program for management of recreational use, law enforcement, and emergency communication at the Poe Project	Butte County	\$0	\$120,000	\$0	\$120,000	No	m
71. Within 1 year of license issuance, provide stream flow information from gage NF-23 (USGS No. 11404500) on the NFFR to the public via a toll-free phone number and/or via the Internet (Forest Service preliminary 4(e) condition no. 31)	Forest Service, Boating Groups	\$5,000	\$1,000	\$0	\$1,730	Yes	a, e
72. Inventory and remove any debris in the project reach that is a risk to public health and safety in cooperation with Caltrans and Union Pacific	Butte County	\$6,000	\$1,000	\$0	\$1,870	No	a
73. Provide recreational flow releases in the Poe bypassed reach	Butte County, Boating Groups	\$0	\$0	\$343,380	\$343,380	No	a
74. Establish and fund a "Recreation Account" as part of a "North Fork Feather Enhancement Fund" to be used for enhancement of river recreation in the Feather River Basin and elsewhere in Butte County	Butte County, Boating Groups	\$2,500,000	\$250,000	\$0	\$613,670	No	m

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
Land Use and Aesthetic Resources Measures							
75. Within 1 year of license issuance, prepare a road management plan and file with the Commission for approval (Forest Service preliminary 4(e) condition no. 40)	Forest Service, staff	\$10,000	\$0	\$0	\$1,450	Yes	a, b, e
76. Within 1 year of license issuance, prepare a fire prevention and response plan and a fuel treatment plan for project lands and file with the Commission for approval (Forest Service final 4(e) condition no. 8 and preliminary condition no. 32)	Forest Service	\$20,000	\$0	\$0	\$2,910	No	a, b, e
77. As an alternative to preliminary 4(e) condition no. 8, within 1 year of license issuance, prepare a fire prevention and response plan addressing NFS lands within the Poe Project boundary and file with the Commission for approval (PG&E alternative 4(e) condition no. 8)	PG&E	\$15,000	\$0	\$0	\$2,180	No	a, b, l

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
78. Within 1 year of license issuance, prepare a fire prevention and response plan and a fuel treatment plan addressing lands within the proposed Poe Project boundary and file with the Commission for approval.	Staff	\$20,000	\$0	\$0	\$2,910	Yes	a
79. Paint the light standards and fixtures situated on top of the Poe dam and the gate and metal pole/chain link enclosure at the Poe dam	PG&E, staff	\$5,110	\$510	\$0	\$1,250	Yes	d
80. Install vegetation and stain on the Bardee's Bar/adit no. 2 embankment	PG&E, staff	\$306,600	\$3,070	\$0	\$47,670	Yes	d
81. Within 1 year of license issuance, prepare a Bardee's Bar tunnel spoil pile revegetation plan and file the plan with the Commission for approval (Forest Service preliminary 4(e) condition no. 33)	Forest Service, staff	\$10,000	\$0	\$0	\$1,450	Yes	a, b, e

Environmental Measures	Entity	Capital Costs (2005\$)	Annual Costs (2005\$)	Annual Energy Costs (2005\$)	Total Annualized Cost (2005\$)	Adopted by Staff?	Notes
82. Within 1 year of license issuance, prepare a visual management plan and file the plan with the Commission for approval (Forest Service preliminary 4(e) condition no. 39)	Forest Service, staff	\$10,000	\$0	\$0	\$1,450	Yes	a, b, e
83. Modify the project boundary to include approximately 21 acres of land associated with the Big Bend dam and reservoir; 20 acres of PG&E land and 1 acre of land owned by the State of California	PG&E, staff	\$0	\$0	\$0	\$0	Yes	a
84. Modify the project boundary to include approximately 6 acres of land associated with proposed recreational enhancements at Sandy Beach, Bardee's Bar, Poe Beach, and a scenic viewpoint along State Highway 70	PG&E, staff	\$0	\$0	\$0	\$0	Yes	a
Cultural Resources Measures							
85. Prepare a final HPMP and file with the Commission (Forest Service preliminary 4(e) condition no. 34)	Forest Service, staff	\$10,000	\$1,000	\$0	\$2,450	Yes	e
86. Monitor effects of any new recreation facilities	PG&E, staff	\$0	\$7,740	\$0	\$7,740	Yes	e

a Cost estimate provided by staff.
 b The actual cost of implementing the plan is dependent on the content of the final plan.
 c Interior and CDFG conditionally withdrew this recommendation, contingent upon the Commission accepting the revised instream flow regime (measure 6).
 d Cost estimate provided by PG&E in the license application.
 e This measure is a mandatory condition, and would be included in a new license for the project.
 f Annual cost assumes \$45,000 per year every other year starting in year 2.
 g Annual cost assumes \$45,000 per year in years 6, 8, 10, 16, 18, and 20.
 h Annual cost assumes \$45,000 per year in years 4, 5, 10, 11, 15, 16, 20, 21, 25, 26, and 30.
 i Annual cost assumes \$30,000 per year every other year starting in year 2.
 j Annual cost assumes \$30,000 per year in years 6, 8, 10, 16, 18, and 20.
 k Annual cost assumes \$30,000 per year in years 4, 5, 10, 11, 15, 16, 20, 21, 25, 26, and 30.
 l Pursuant to the Energy Policy Act of 2005, PG&E proposed this to the Forest Service as an alternative to the Forest Service preliminary 4(e) condition. PG&E has since withdrawn this condition because of agreement with the Forest Service on the final 4(e) condition. Thus, we do not include the cost of PG&E’s alternative 4(e) condition in the total cost for its proposal.
 m Cost estimate provided by Butte County in its letter dated April 11, 2005.
 n Annual cost assumes \$12,500 per year in years 1-5 and years 7, 9, 11, 13, and 15.
 o Annual cost assumes \$1,000 per year starting in year 1, plus \$7,500 per year in years 10, 20, and 30.
 p PG&E has proposed to implement noxious weed control measures on project lands, but has not provided a specific plan for implementation of the measures.
 q Annual cost assumes \$18,000 per year in years 1-4 and years 8, 12, 16, 20, 24, and 28, although actual sampling interval may differ after development of plan.
 r Cost estimate provided by PG&E in its comments on the draft EA.
 s Cost estimate provided by Natural Heritage Institute for Butte County and American Whitewater in their letter dated September 19, 2006.
 t Capital cost provided by PG&E in its letter dated May 23, 2005, and the annual cost was provided by staff.
 u Cost estimate provided by Forest Service in its April 5, 2006, letter.
 v We assume that the enhancements proposed by PG&E at Sandy Beach, Bardee’s Bar and Poe powerhouse would satisfy this measure at no additional cost.

VII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require that the Commission give equal consideration to all uses of the waterway on which the project is located. When we review a proposed project, we consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

A. RECOMMENDED ALTERNATIVE

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the proposed project, with staff-recommended modifications, as the recommended alternative. This alternative includes elements of the Forest Service's 4(e) conditions, the licensee's proposed measures, and some staff-recommended additional measures. We recommend this alternative because (1) issuance of a new hydropower license by the Commission would allow PG&E to operate the project as an economically beneficial and dependable source of electric energy; (2) the 142.83-MW project would eliminate the need for an equivalent amount of fossil-fuel derived energy and capacity, which helps conserve these non-renewable resources and limits atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would improve water quality, protect and enhance fish and terrestrial resources, improve public use of recreational facilities and resources, and protect and maintain historic and archaeological resources within the area affected by project operation. In addition to the power and resource benefits associated with the issuing of a new license for Poe project, PG&E, as licensee, would continue to pay local state local and federal taxes associated with the facilities. In 2003, PG&E paid about \$380,000 in property, franchise, business and other local taxes, which benefit the surrounding communities.

Our recommended alternative includes many of the conditions specified by the Forest Service pursuant to section 4(e) of the FPA, although we do not recommend adopting all such conditions. We do not recommend the following: implementation of the specified minimum flow regime (no. 24[1]); additional recreational enhancements at Sandy Beach (no. 29[E]); and annual funding to the Forest Service for a river ranger position (no. 30). We recognize that the Commission may include all of the Forest Service's 4(e) conditions in any license issued for the project, due to their mandatory nature.

In some cases, we recommend measures that are the same as those specified by the Forest Service, but that vary in timing or geographic scope. For some measures, we

recommend more protective schedules (i.e., more frequent sampling over a longer duration) or increasing the geographic scope to include the entire project boundary, not just Forest Service lands within the boundary.

We describe the rationale for our recommendations and for not recommending certain Forest Service 4(e) conditions and certain fish and wildlife agency 10(j) recommendations in the following section.

1. PG&E's Proposed Measures

We recommend including the following measures proposed by PG&E in any license issued for the Poe Project:

- Continue the operation and maintenance of PG&E stream gage NF23 for the measurement of minimum flows below Poe dam, and discontinue the use of PG&E stream gage NF66, a staff gage immediately below Poe dam.
- Conduct surveys for sensitive wildlife species and coordinate with resource agencies for protection of these species if additional activities that could affect sensitive species should occur in the project area.
- Provide recreational improvements at Sandy Beach, including a portable toilet and garbage facilities, additional signage, re-gravelling the existing road, and trimming vegetation.
- Provide recreational improvements at Bardee's Bar, including a permanent picnic table, trash receptacle, vault toilet, and additional signage, with "pack-it-in/pack-it-out" policy.
- Provide recreational improvements at Poe Beach, including better site access (stairs or trail) and additional signage, with "pack-it-in/pack-it-out" policy.
- Provide recreational improvements at Poe powerhouse, including a permanent vault toilet, garbage facilities, additional parking along the road to the beach, and additional signage.
- Improve an existing scenic viewpoint on Highway 70, if acceptable to Caltrans, and provide additional signage.
- Modify the project boundary to include approximately 21 acres of land associated with the Big Bend dam and reservoir; 20 acres of PG&E land and 1 acre of land owned by the state of California.

- Modify the project boundary to include approximately 6 acres of land associated with proposed recreational enhancements at Sandy Beach, Bardee's Bar, Poe Beach, and a scenic viewpoint along State Highway 70.
- To enhance visual resources, conduct minor painting at Poe dam, remove the steel bridge at Bardee's Bar, initiate revegetation of the Bardee's Bar spoil pile, and implement erosion control measures at the toe of the spoil pile near the NFFR.
- Monitor two archaeological sites (CA-BUT-42H and CA-BUT-1665) after the recreation season each fall for 5 years.

2. Staff's Recommended Measures

We also recommend including the following measures in any license issued for the Poe Project:

- Release the following minimum instream flows, as measured at the Pulga gage about 1.6 miles downstream of Poe dam:

Month	Wet Year (cfs)	Normal Year (cfs)	Dry Year (cfs)	Critically Dry Year (cfs)
October	200	200	150	150
November	215	200	150	150
December	225	225	165	150
January	250	225	165	150
February	250	225	190	190
March	250	225	215	210
April	275	250	215	210
May	300	275	200	200
June	250	225	180	180
July	225	200	180	165
August	225	200	180	165
September	225	200	165	165

- As an interim measure, release a single 24-hour, 2,000-cfs pulse flow by February 15 in water years classified as dry or critically dry, if a natural or project related release of the same magnitude has not occurred in the preceding 18 months. Licensee would ramp-up to 2,000 cfs through the implementation of staff-recommended ramping rates, hold the pulse flow for a period of 24 hours, and then ramp-down at the recommended rate. For the protection of rainbow trout spawning, any pulse flow releases should be made by February 15. Also, pulse flows should not be made if two successive days of water

temperatures have exceeded 10° C, or if rainbow trout spawning has been observed by Cal Fish and Game or other entities. Upon completion of the recommended pulse flow monitoring (see below), the interim pulse flow could be modified accordingly, if study results indicate that a change is appropriate. Total duration of an individual interim pulse flow event would be approximately 41 hours, including ramping.

- Within 1 year of license issuance, prepare, in consultation with the resource agencies, and file with the Commission for approval, a pulse flow monitoring plan, in accordance with Forest Service final 4(e) condition no. 24(2)(B) to evaluate the movement of organic and fine-grained materials in the Poe reach during pulse flows. The monitoring would be designed to identify any needed fine-tuning of the magnitude and duration of pulse flows needed to effectively remove fine-grained sediments and organic materials from spawning gravels. Long-term monitoring would include provisions for possible modifications to the pulse flow schedule depending on monitoring results, after implementation of the first three pulse flow events.
- Within 1 year of license issuance, prepare, in consultation with the resource agencies, and file with the Commission for approval, a ramping rate plan, schedule, and effectiveness monitoring plan. The ramping rate plan should address the operational and equipment issues at PG&E's upstream Rock Creek-Cresta dam that currently limit the control of Poe Project ramping rates, and consider the 5th year Rock Creek-Cresta Project ramping rate report that is due in May 2007.
- In the interim, until the ramping rate plan and schedule are developed and ramping rate controls at Rock Creek-Cresta dam are addressed, PG&E shall implement ramping rates for spillway operations at Poe dam as follows: 250 cfs/hour up-ramp from March 1 through September 30 to protect breeding FYLF, egg masses, tadpoles, frog metamorphs, and juvenile frogs; 400 cfs/hour up-ramp from October 1 through February; and down-ramp of 150 cfs/hour year-round. These interim ramping rates would be implemented at all Poe dam spillway flows under PG&E's control, or below about 3,000 cfs.
- Develop a streamflow gaging management plan for the Pulga gage in consultation with the resource agencies, and file the plan with the Commission for approval. PG&E also would operate and maintain the Pulga gage, implement the streamflow gaging management plan, and forecast the water year type.
- Prepare and implement a Poe bypassed reach water temperature monitoring plan to evaluate changes in temperature resulting from new minimum instream flows and to monitor water temperatures of the inflow to the Poe Project. The

plan would be prepared in consultation with the resources agencies, filed with the Commission for approval, and consist of continuous temperature monitoring from June 1 through September 30 for the 3 years following issuance of a new license, provision of monitoring results to the resource agencies and the Commission on a timely basis, and an annual report to be submitted by October 31. The plan would include provisions for possible modification of the monitoring program after the completion of the first 3 years of monitoring, and, depending on the monitoring results, changes in the instream flow releases in the reach, if such changes would result in beneficial reductions in water temperatures. At the completion of the 3-year monitoring program, and following implementation of any operational changes, PG&E would continue to monitor water temperature in the bypassed reach for the duration of the license term.

- Within 1 year of license issuance, prepare in consultation with the resource agencies and file with the Commission for approval, a Poe bypassed reach fisheries monitoring plan. Monitoring would be conducted separately from any related macroinvertebrate and amphibian studies that are ordered as conditions of a license. Consecutive annual monitoring in the Poe bypassed reach for fish would begin in years 4 and 5 after license issuance, and continue as such in 5-year intervals for the duration of the license term. Annual reports would be required within 6 months following completion of each study, and would compare, contrast, and summarize results from previous monitoring. The plan would include provisions for possible modification to the flow regime if the results indicate that such a modification is necessary. Specific thresholds and criteria for evaluating the response of biotic communities to license conditions would be developed and included in the study plan, after consultation with the resource agencies. The plan would include specific objectives and criteria/decision points for determining whether the objectives are met, including wild trout age class, average size (length and weight), length-frequency distribution, total biomass (pounds/acre), harvestable component, and angler catch rate (including catch and release).
- Within 1 year of license issuance, and in consultation with the resource agencies, prepare and file with the Commission for approval, a plan to monitor the effects of project operations on outmigrating juvenile rainbow trout from Flea Valley Creek and Mill Creek, and the accessibility of these tributaries as coldwater refugia for adult or sub-adult rainbow trout during the summer months. The applicant's plan and subsequent evaluation would include an assessment of hydrologic connectivity between the NFFR and Flea Valley Creek and Mill Creek during the summer and fall months (July through October) under any new license conditions. The applicant's plan would also include provisions for long-term monitoring to assess whether geomorphic stream alterations (e.g., gravel deposition) adversely affects tributary access.

Long-term monitoring of tributary access for rainbow trout would be done in conjunction with other monitoring efforts required by the Commission (e.g., fisheries, amphibians, and macroinvertebrates). The applicant would consult with the Forest Service, Cal Fish and Game, Interior, and other interested parties by January 31 after each study period to review monitoring results. If, after review and consultation, the applicant and the resource agencies determine that project operations are adversely affecting the outmigration of juvenile rainbow trout, or adult or sub-adult rainbow trout access to coldwater refuge habitat during the summer months, the applicant would develop modifications to project operations or other measures to ensure fish accessibility to these tributary streams.

- Within 1 year of license issuance, prepare a Poe bypassed reach benthic macroinvertebrate monitoring plan. The plan would be prepared in consultation with the resources agencies, and be filed with the Commission for approval. The plan would include specific objectives and criteria/decision points for determining whether the objectives are met, including biodiversity, total biomass, species richness, and condition of EPT. Monitoring in the Poe bypassed reach would begin in years 4 and 5 after license issuance. After the initial 2-year monitoring period, two consecutive annual surveys would be implemented every 5 years for the remainder of the license to evaluate long-term responses to measures implemented in the new license, and any subsequent modifications to project operations. Macroinvertebrate surveys would be conducted during late summer/fall and be coordinated with the fish and amphibian monitoring studies, but would be separate from those studies to avoid compromising the results. Annual reports would be required within 6 months following completion of monitoring, and would compare, contrast, and summarize results from previous monitoring studies. The plan would include provisions for possible modification of the flow regime depending on the monitoring study results.
- Develop and implement an amphibian monitoring plan, to be developed in consultation with the agencies and filed with the Commission for approval. The plan would include annual surveys for the duration of the license, to determine the long-term effects from changes in minimum flows on breeding FYLF frogs, frog egg masses, tadpoles, and frog metamorphs. Monitoring would be conducted separately from fisheries and macroinvertebrate monitoring to avoid compromising the results. The plan would include a requirement for regular reporting to the resource agencies and the Commission, and include provisions for possible modification of the flow regime depending on the monitoring study results.
- Every 6th year after license issuance for the term of the license, file with the Commission, an instream flow effects monitoring report to comprehensively

describe and summarize the results of all monitoring activities associated with project minimum flows. These reports would summarize all monitoring activities associated with project minimum flows conducted since the issuance of the license or since the previous instream flow effects monitoring report. During preparation of the report, the applicant would consult with the resource agencies to review results and assess conditions pertaining to the biotic community and abiotic riverine characteristics in response to project operations. If, after review, the resource agencies determine that aquatic species or other ecological attributes may benefit from modifications to the minimum instream flows required by the license, then the applicant and the resource agencies would evaluate and determine whether such instream flow modifications: (1) can be implemented within the applicant's operational capabilities; (2) would maintain the total annual volume of water that has been allocated for minimum instream flows in any given water year, and (3) would not adversely affect other beneficial uses, including hydroelectric power generation and recreation. Any new instream flow recommendation made by the applicant in consultation with the resource agencies would be filed with the Commission for approval at the same time as the filing of the instream flow effects monitoring report. This 6-year report would be supplemented by annual reports that would provide monitoring and study results occurring in years that the 6-year report is not prepared.

- Annually review the list of special status species and consult with the Forest Service to determine if study plans are needed for newly listed species, and survey areas on National Forest System lands in the project area directly affected by project operations to determine possible project effects on newly listed species.
- Develop, file with the Commission for approval, and implement a noxious weed management plan for control of noxious weeds on project lands related to project activities.
- Develop, file with the Commission for approval, and implement a riparian monitoring plan, including surveys in years 1-4 and at sampling intervals thereafter to be determined during development of the plan, to determine the effects on riparian vegetation from changes in instream flows.
- Within 6 months of license issuance, update, file with the Commission for approval, and implement the Bald Eagle Management Plan for the Poe powerhouse nesting territory.
- Within 1 year of license issuance, prepare a recreation management plan in consultation with appropriate federal, state, and local agencies (including, but not limited to, the Forest Service, FWS, NMFS, the Water Board, Cal Fish and

Game, CDBW, and Butte County) and file with the Commission for approval. The plan would provide for monitoring recreational visitor use at Sandy Beach, Bardee's Bar, Poe Beach, and the Poe powerhouse to assess use levels to determine if additional facilities are needed.

- Conduct a feasibility study on improving an existing abandoned trail between Bardee's Bar and the Poe powerhouse road and compare the results of this study with the information provided in PG&E's September 2006 feasibility report on modifying the abandoned construction road for use as a trail; and develop an all-weather hiking trail in one of the two locations, based on the results of the study.
- Implement measures to improve and protect public access for angling, such as additional public parking, public rest rooms, and public hiking trails to allow anglers to safely access the NFFR.
- Within 1 year of license issuance, provide stream flow information from gage NF23 (USGS gage 11404500) on the NFFR to the public, via a toll-free phone number and/or via the Internet.
- Within 1 year of license issuance, prepare a road management plan and file with the Commission for approval.
- Within 1 year of license issuance, prepare a fire prevention and response plan and a fuel treatment plan for lands within the project boundary and file with the Commission for approval.
- Within 1 year of license issuance, prepare a Bardee's Bar tunnel spoil pile revegetation plan and file with the Commission for approval.
- Within 1 year of license issuance, prepare a visual management plan and file with the Commission for approval.
- Within 6 months of license issuance, prepare a final HPMP in consultation with appropriate federal, state and local agencies and file with the Commission for approval.

3. Rationale for Staff Recommendations

Minimum Instream Flows

PG&E proposed an increase in minimum flows for the bypassed reach to 150 cfs, while the Forest Service specified (4(e) condition no. 24[1]) and the resource agencies recommended a seasonal flow regime, which the resource agencies later revised in their

comments on the draft EA (the Forest Service did not change condition no. 24(1)). Our analysis of the PG&E-proposed flow, the Forest Service specified flow, the agency revised flow regime, and a flow regime developed by staff indicates that all flow regimes would result in an increase in habitat (WUA) for six of the eight species and life stages evaluated in the instream flow study, although the flows specified by the Forest Service, recommended by the resource agencies, and the flow regime developed by staff would provide greater increases in available habitat than the PG&E proposal. For example, we examined the percent of maximum available WUA that would be provided by the alternative flow regimes over the critical summer months (appendix B). We found that the flows recommended by PG&E would increase available juvenile rainbow trout habitat to approximately 71 percent of maximum WUA, the staff flow regime would provide 79 percent of maximum WUA, the Forest Service flow would provide about 85 percent of maximum WUA, and the agency revised flows would provide about 91 percent of maximum WUA in July of a “normal” year. Similar habitat gains were observed for other species and life stages and in other water year types, for those species and life stages (and total wetted area) that would gain habitat with increasing flows. The staff identified flow regime would provide substantially higher levels of habitat than the PG&E-proposed flow regime for most species and life stages. For the two species whose habitat would be reduced at higher flows (adult hardhead and juvenile Sacramento sucker), the staff flow regime would maintain more habitat than the Forest Service or revised agency flow regime.

Increasing the volume of water in the Poe bypassed reach also would benefit other components of the aquatic riverine ecosystem, including the macroinvertebrate community, amphibians and their associated stream margin habitat, riparian vegetation, and water quality. It also would benefit other resources that depend on one or more of these resources, such as recreational fishing. Due to the small capacity of Poe reservoir, large-scale natural hydrologic events that typically result in spillage into the bypassed reach would continue, especially in wet and normal years.

In addition to the benefits associated with their higher flow volumes, the variable nature of the Forest Service, revised agency, and staff flow regimes would provide ecological benefits beyond those provided by a static flow regime, such as that proposed by PG&E. By better mimicking the unimpaired annual hydrograph of the NFFR, under which most of the aquatic biota evolved, a variable flow regime provides important environmental cues that serve as triggers for various behaviors (e.g., spawning and migration). We note that PG&E has implemented variable minimum flow regimes at its upstream Rock Creek-Cresta Project and has proposed them for its UNFFR Project.

Our analysis also indicated that higher instream flows would result in some reductions in water temperatures, with the magnitude of the reductions varying depending on the type of water year and weather conditions. As such, the higher flows would help achieve the water temperature target of no greater than 20°C, at least during some months

and meteorological conditions. Among the four alternative instream flow regimes assessed, the revised agency flow regime would lower water temperatures the most, followed by the Forest Service flow, the staff flow regime, and PG&E's flow proposal. Another consideration related to water temperature is the potential that future measures implemented by upstream entities could result in reductions in water temperatures in the inflows to the Poe Project. With lower inflow temperatures, there would be a greater potential for higher minimum flows from the Poe Project to reduce temperatures to under the maximum temperature target of 20°C.

After considering the effects of the four instream flow alternatives on aquatic habitat, the potential for enhancement (reduction) of water temperatures, and project economics, we recommend the staff-identified minimum flow regime. The staff flow regime would provide substantially greater aquatic habitat improvement than the PG&E flow regime, but would result in substantially less impact on project economics than the Forest Service flows or the revised agency flow regime. We find that, while there are some small gains in habitat value and in the ability of the revised agency flow regime to reduce water temperatures, compared to the Forest Service specified or staff recommended flow regimes, we do not see that those gains outweigh the high cost of implementing such a regime. We estimate that the staff alternative would result in a reduction in generation of 29,180,000 kWh annually and a reduction in annual power value of \$1,639,920, from the no-action alternative. This compares to a reduction in energy generation of 62,800,000 kWh and a reduction in annual power value of \$3,529,360 for the revised agency flow recommendation, a reduction in energy generation of 51,000,000 kWh and a reduction in annual power value of \$2,866,200 for the Forest Service flow specification, and a reduction in generation of 18,802,000 kWh and annual power value of \$1,056,560 for the PG&E-proposed minimum flow.

Although the staff minimum flow alternative would result in some additional cost to the project, it would be substantially less costly than the Forest Service or revised agency flow regime, and would provide a substantially better level of protection for aquatic habitat than the PG&E proposal, particularly related to net increases in habitat, provision of a more natural variable flow regime, and reduction of water temperature. The expected enhancement to aquatic habitat that would occur in the 7.6 miles of riverine habitat in the Poe bypassed reach, with secondary benefits to recreation and aesthetics due to higher flows in the reach, would be worth the cost of providing the staff-identified minimum flows.

Water Temperature Moderation Flows

The initial agency-recommended minimum flow regime also included water temperature moderation flows, along with a Water Temperature Maintenance, Moderation, and Monitoring Plan, to address the issue of warm water temperatures. Temperatures in the Poe reach often exceed the Water Board targeted maximum mean daily temperature of 20°C. The water temperature moderation flows would be flow

releases in addition to regular minimum flows, made to reduce water temperatures in the Poe bypassed reach. The Water Temperature Maintenance, Moderation, and Monitoring Plan would specify the monitoring program in the reach, and the procedures for implementing the water temperature moderation flows. The revised agency flow recommendation does not include WTM flows or the Water Temperature Maintenance, Moderation, and Monitoring Plan, contingent upon the Commission adopting the revised flow recommendation, which the agencies state would provide for water temperature reductions in the Poe reach without having to release higher WTM flows during the summer months. We retain our analysis of WTM flows in this EA because of the conditional nature their withdrawal by the resource agencies and because they remain a Forest Service 10(a) recommendation.

Our analysis indicates that the temperatures of inflows to the Poe reach are the primary determinant of water temperature in the reach and that although higher flow releases into the reach would have some effect on lowering water temperatures, the volume of flow required to reduce temperatures to below the 20°C maximum target would be high. In many conditions, the flows required would be higher than the agencies' WTM flows and would potentially adversely affect other resources in the reach, such as amphibians. Certain life stages of amphibians that are present in the reach during the summer months (such as FYLF tadpoles) prefer shallow, low-velocity waters, and high flow releases would create unsuitable habitat and could flush tadpoles downriver to less suitable habitat. We also estimate that implementation of water temperature moderation flows would have a substantial annual cost of \$971,020 and a reduction in generation of 16,000,000 kWh. Because of the potential for adverse effects to some aquatic biota, high cost, and the limited ability to achieve the maximum temperature target, we are not recommending the water temperature moderation flows. We do, however, recommend the preparation of a water temperature monitoring plan (see below).

Streamflow Gaging

Associated with the release of a new minimum flow regime, Interior recommends the development of a streamflow gaging plan by the applicant (to be filed for Commission approval), and that PG&E continue to operate and maintain the existing NF23 gage, where the new flows would be measured. While PG&E proposed to operate and maintain the gage, it did not propose to develop a plan as to how it would maintain the gage, record the flow data, and make the data available to the Commission, other agencies, and the public. We agree that PG&E should prepare and implement the recommended gaging plan and maintain the gage, because these measures would allow for monitoring of the flows that are released into the bypassed reach (for compliance purposes), and would also ensure that there is a good flow record for the reach, in the event that future adjustments in the minimum flow are required, based on the response of the biological community to these flows. We estimate that implementing the gaging plan

and maintaining the gage would have an annualized cost of \$2,450, which would be a reasonable cost for these activities that would ensure the continued collection of flow data for the bypassed reach.

Water Temperature Monitoring

Most of our analysis of the water temperature issue is based on the water temperature modeling conducted by PG&E. Temperature modeling, although an excellent tool for assessing potential future water temperatures under a variety of operating conditions, cannot predict with certainty the water temperatures that would occur with implementation of higher minimum flows in the Poe bypassed reach, or that may result from any future measures to reduce water temperature upstream. The natural variability of weather events can often not be fully captured by modeling. Therefore, it would be appropriate for PG&E to monitor water temperature within the bypassed reach, including inflow water temperature, on a long-term basis, to determine the actual effects of higher minimum flows and any changes in the inflow temperature. This would require temperature monitoring throughout the reach, to determine the critical periods and reaches, and the temperatures that would result from implementation of the recommended new minimum flow regime. Long-term monitoring would be required because of the effects of year-to-year variations in weather conditions and inflows, although it would be appropriate to review the results of the first 3 years of monitoring, and then potentially modify the program (number and location of sampling stations, sampling intervals, etc.) after that review. Depending on the results of the first 3 years of monitoring, it may also be possible to modify the flow releases into the reach, if the monitoring indicates such modifications would help in reducing water temperatures to below the 20°C target.

Therefore, we are recommending the development of a temperature monitoring plan, which would allow reassessment of the program after the first 3 years of monitoring, and then continued monitoring for the life of the license. We estimate that developing and implementing this plan would have an annual cost of \$50,000. However, because of the importance of water temperature in supporting trout populations, the anticipated reductions in summer water temperature associated with a new minimum flow regime, and potential future reductions in influent water temperatures from implementation of measures upstream of the project, we conclude that the benefits of water temperature monitoring would be worth the cost.

Pulse Flows

The Forest Service specified, and Interior, Cal Fish and Game, and Butte County recommended, that pulse flows of 2,000 cfs be released into the bypassed reach to provide an artificial “freshet” that would flush fines from spawning gravels and transport organic materials, if a similar natural or operational-related flow event has not occurred in the previous 18 months, as measured from February 10 of each year. Pulse flows

would occur prior to March 1, or before water temperatures reach 10°C, to protect rainbow trout spawning and FYLF. Two different durations for the pulse flows were indicated: 72 hours by Cal Fish and Game, and 12 hours by the Forest Service, Interior, and Butte County. PG&E, did not specifically agree with the 12-hour resource agency pulse flows, but did argue against the longer-duration flows recommended by Cal Fish and Game.

The agencies provided no specific justification for a pulse flow of 2,000 cfs, or why an alternative pulse flow (such as 1,000 or 3,000 cfs) would not be appropriate. Our analysis of the hydraulic record, however, indicates that flows up to 2,000 cfs are relatively common in the Poe bypassed reach (see table 22). A flow of 2,000 cfs also approximates the mean monthly flows that have occurred in January (1,682 cfs), February (1,497 cfs), and March (1,899 cfs), and is about the same as the 25 percent exceedance flow for March (1,970 cfs). Thus, a flow of about 2,000 cfs is not unusual for the reach, and as a 25 percent exceedance flow, would be considered a relatively high “freshet,” but not a major flood flow. There have been periods, however, where flows of 2,000 cfs (or higher) have not occurred for 18 to 24 consecutive months in the reach. Although it is not common (four times in 24 years of record; see table 22), there are periods in which the bypassed reach does not receive the benefit of this “freshet.”

Periodic flows of 2,000 cfs would ensure the mobilization of substrates up to approximately 20-30 mm (coarse gravels), would effectively remove and redistribute silts and fines, and would likely decrease the embeddedness of spawning gravels. Although higher flows and longer-duration flows would also provide similar or perhaps more benefits, site-specific information is necessary to assess the magnitude and duration of the flow schedule needed to effectively maintain high quality spawning habitat in the Poe bypassed reach. We agree with the resource agencies that there would be substantial benefits in providing pulse flows, if similar flows have not occurred for a period of 18 months. Because there is little site-specific information pertaining to the Poe reach, we are recommending pulse flow monitoring to fine-tune the magnitude and duration of a pulse flow. As an interim measure, we are now recommending a pulse flow of 24 hours at 2,000 cfs, instead of the 12-hour pulse flow that we recommended in the draft EA. Cal Fish and Game indicated that a pulse flow of longer than 12 hours may be justified, but if the results of the monitoring indicate that an alternative pulse flow schedule for the Poe reach is more appropriate, the final schedule could be adjusted accordingly. We estimate that a 24-hour pulse flow would have an annual cost of \$20,510, due to lost energy generation of 365,000 kWh. In contrast, the 72-hour pulse flow recommended by Cal Fish and Game would have an annual cost of \$39,120 and a generation loss of 696,000 kWh. We conclude that the benefits of the interim 24-hour pulse flows are worth the cost.

As pointed out by PG&E, pulse flows have the potential to affect early-spawning rainbow trout and should be made by February 15 instead of March 1. We agree and

recommend that, to protect rainbow trout that may have begun spawning, any pulse flow releases should be made by February 15. Also, pulse flows should not be made if two successive days of water temperatures have exceeded 10° C, or if rainbow trout spawning has been observed by Cal Fish and Game or other entities.

The Forest Service specified a pulse flow monitoring plan, to monitor the effects of any pulse flows that are released (evaluate movement of organic and fine-grained materials), with the provision to modify the pulse flows after the first three pulse flow events, depending on the monitoring results. We agree that this would be a reasonable requirement, because the precise effects of a 2,000-cfs pulse flow cannot be predicted with certainty. Monitoring may indicate that a higher or lower flow, or a different duration for the flow (less or more than 24 hours), may be required to achieve the desired effect in the reach. We conclude that a pulse flow monitoring program would be worth its estimated annual cost of \$7,270.

Ramping Rate Plan

FWS and Cal Fish and Game recommended and the Forest Service specified that the applicant develop a ramping rate plan. We did not recommend a ramping rate plan in the draft EA because we concluded that appropriate ramping rates had already been identified, and there was no need for a plan to determine what they should be. In comments on the draft EA and during discussions at the November 2006 section 10(j) meeting, however, it became evident that implementing ramping rates from Poe dam is a more complex issue than the record had indicated. For example, ramping rates at Poe dam are heavily influenced by flow fluctuations caused by inefficient ramping operations at the upstream Rock Creek-Cresta Project, which they are working to better control. Therefore, it would be appropriate for PG&E to develop a ramping rate plan at Poe dam; the plan would include consideration of ramping operations at Rock Creek-Cresta.

Interim ramping rates, however, should be provided at Poe dam to offer interim protection for aquatic resources while a more permanent ramping rate plan is developed. The rates recommended by FWS and specified by the Forest Service would offer adequate protection for most aquatic resources, although our analysis of potential effects on FYLF indicates that it would be appropriate to extend the agencies recommended up-ramping rate of 250 cfs/hr for 3 months (i.e., through September 30), to protect all breeding life stages of FYLF, leaving 400 cfs/hour from October 1 through the end of February. Down-ramping rates should be 150 cfs/hour year-round, as recommended by the agencies. These ramping rates would be provided at spillage flows under about 3,000 cfs, the point at which PG&E has some control of the river. We estimate that developing a ramping rate plan would have an annual cost of \$2,910, while implementing interim ramping rates would cost \$14,980 annually. These are reasonable costs to ensure the protection of aquatic resources in the Poe reach from rapid changes in spillage rates from Poe dam.

Fish Passage

Interior, NMFS, Butte County, and the Anglers Committee made recommendations regarding fish passage at the project. Interior and NMFS, through their preliminary and final section 18 prescriptions, reserved their authority to prescribe the construction, operation, and maintenance of fishways at the project in the future. NMFS, however, has indicated that they expect to reach final agreement with the applicant and CDWR on a Habitat Expansion Agreement (HEA), which would provide for greater protection of Central Valley spring-run Chinook salmon and Central Valley steelhead than was provided for in previous section 18 fishway prescriptions for the Poe Project. The HEA will focus efforts on high-priority restoration areas in the watershed. Until a comprehensive fish passage plan for the Feather River is developed, fish passage at the Poe dam would likely provide little benefit to anadromous fish until they have been passed around downstream facilities.

Interior also recommended (under section 10(j)) that PG&E develop and implement, in consultation with the resource agencies and other project owners, a reconnaissance-level fish passage feasibility study for the NFFR drainage. Butte County and the Anglers Committee both made recommendations regarding passage at Big Bend dam. They recommended either replacement of the existing non-functional fishway at the dam with a new fishway, or removal of Big Bend dam to allow passage of fish from Lake Oroville into the Poe bypassed reach.

Consistent with Commission practice, we recommend the reservation of authority for Interior and Commerce to prescribe fishways in the future, pursuant to section 18 of the FPA. We do not, however, recommend the fish passage feasibility study, which would include assessment of potential fish passage measures at the Poe Project. PG&E already conducted such an assessment and included the results in its license application. Although the estimated cost for this study would be modest (annualized cost of \$7,270), we see no need to repeat a study that has already been completed. We also do not recommend installation of a new fishway at Big Bend dam or removal of that dam for fish passage. There are no anadromous fish migrations in the NFFR upstream of Oroville dam that would benefit from passage, and although fish passage at Big Bend dam would allow resident fishes from Lake Oroville to utilize the habitat in the Poe bypassed reach, there may be associated adverse effects. Although passage could benefit some native species (e.g., rainbow trout and hardhead), providing upstream passage at Big Bend also would allow non-native predatory fishes to access the bypassed reach. These could include smallmouth bass and brown trout and other non-indigenous species found in Lake Oroville, including bluegill, redear sunfish, black and white crappie, coho salmon, and green sunfish. These species could compete with native species in the reach and could also negatively affect sensitive amphibian species by preying on some of the life stages of these species. The estimated cost for a new fishway at Big Bend dam would also be high

(capital cost of \$8,176,000 and an annualized cost of \$1,266,010), and we see little benefit to providing such a facility.

Removal of Big Bend dam for fish passage would have few biological benefits, as described above, but would also have other negative effects on downstream biological resources, and serious operational effects. Big Bend dam and reservoir have served a re-regulating function by dampening the effects on downstream resources of the fluctuations in releases from the Poe powerhouse, which range from zero up to a maximum of about 3,700 cfs in a period of only 10 minutes. If the dam was removed, the riverine habitat, which would extend from the powerhouse tailrace to the backwater effect of Lake Oroville (which would vary depending on the elevation of Lake Oroville, but is as much as 7 miles when Lake Oroville is at an elevation of 650 feet), would be exposed to the full fluctuations from the Poe powerhouse. The biological resources in that reach would be exposed to widely fluctuating discharges and water levels, stranding, and flushing. Removing the dam also could mobilize the estimated 900,000 cubic yards of sediment that has accumulated in the impoundment, which would affect resources within and downstream of the former dam and reservoir site (if removed). Potential toxicity and contaminant issues associated with that sediment also would have to be addressed. Operationally, Big Bend reservoir serves as the afterbay for the Poe powerhouse and provides an important hydraulic function for the turbine generators. If the reservoir is removed, that function would have to be replaced by a new afterbay that would have to be constructed, or the turbine generators would have to be modified to accommodate a lower tailwater elevation. The costs for removing the dam or for constructing alternative facilities to allow the powerhouse to continue to operate have not been estimated, but these costs would likely be substantial, with few benefits realized.

Rainbow Trout Access to Tributaries

Both Interior and Cal Fish and Game recommended and Forest Service specified that PG&E assess rainbow trout access to the two major tributaries to the Poe bypassed reach, Mill and Flea Valley creeks, and measures that could be implemented to improve such access. We did not recommend that monitoring in the draft EA because PG&E already conducted a study of adult spawner access to the creeks in 1999 and provided the results in the license application. During the course of the section 10(j) process, however, the agencies clarified that their recommendation had more to do with juvenile rainbow trout movement out of the creeks during the summer low-flow months, and adult and sub-adult use of the creeks as coldwater refugia during those months. It was also discussed that these investigations could easily be conducted during the course of other fisheries studies that would be required by the license. We agree that this monitoring of usage of the creeks by rainbow trout during the summer months should be conducted. If monitoring indicates some effects related to project operations, appropriate protective measures should be implemented. We estimate that this study would have an annual cost of \$20,000, but would be worth the cost if adverse effects are detected that can be

corrected, resulting in enhancement of the use of these important tributaries by rainbow trout.

Biological Monitoring Plans

Several resource agencies recommended and the Forest Service specified monitoring plans for the Poe bypassed reach to assess the response of macroinvertebrates, amphibians, and fish to the recommended new minimum flow regime, with provisions for modification of those flows depending on the monitoring study results. PG&E did not express opposition to monitoring plans, although it indicated that such plans should have specific objectives with detailed measurement criteria and decision points prior to acceptance of any post-licensing plans. We agree with the agencies that such plans are needed to measure the response of biological resources to the new minimum flow regime, with the provision for possibly modifying the flows if the monitoring indicates that changes in the flows would have a definitive benefit to these resources. At the same time, we also agree with PG&E that any monitoring plans should have specific objectives and decision points. Thus, we recommend development of specific objectives, decision points, and methodologies in consultation with the agencies and that the plans be filed with the Commission for approval. This would allow resolution of differences between the Forest Service's specified and Interior's recommended plans. We also recommend a monitoring plan to assess the response of riparian vegetation to our recommended minimum flow regime, with provisions for modifying the flows as indicated above. At this time, however, we differ with some of the agencies on timing and frequency of monitoring events, as follows:

Monitoring Plan	Agency-recommended or -specified Frequency	Staff-recommended Frequency
Fisheries	Every other year starting in year 2 (Interior) Years 6, 8, 10, 16, 18, and 20 (Forest Service)	Years 4, 5, 10, 11, 15, 16, 20, 21, 25, 26, and 30 ^a
Macroinvertebrate	Every other year starting in year 2 (Interior) Years 6, 8, 10, 16, 18, and 20 (Forest Service)	Years 4, 5, 10, 11, 15, 16, 20, 21, 25, 26, and 30 ^a
Amphibian	Years 1-5 and years 7, 9, 11, 13, and 15 (Forest Service) Annually over the term of the license (Interior)	Same as Interior
Riparian	None	Years 5, 10, 15, 20, 25, 30 ^a

^a This assumes a 30-year license. If a longer term license is issued, monitoring would continue at 5-year intervals.

For the fisheries and benthic macroinvertebrate monitoring plans, Interior recommends monitoring every 2 years for the term of the license, while the Forest Service specifies monitoring in years 6, 8, 10, 16, 18, and 20. Interior's recommended frequency is excessive, while the Forest Service's specified monitoring may not begin soon enough to identify biological effects associated with project operations. We recommend that monitoring not begin until 4 years after the new minimum flows have been implemented, to allow biological communities time to adjust to the new flow regime and to begin to show measurable effects. Beginning monitoring prior to that would likely be premature. Monitoring every other year as recommended by Interior would likely be excessive. As an alternative, we recommend consecutive annual monitoring to begin in years 4 and 5, and continue as such in 5-year intervals for the term of the license. This is consistent with Cal Fish and Game's recommendation for fisheries monitoring included in its comments on the draft EA, and as discussed among the other agencies in the November 28, 2006 section 10(j) meeting. This monitoring frequency would allow for any long-term changes in the fish and macroinvertebrate populations to be identified, but at a lower effort and cost than a more-frequent monitoring program, and for adjustments to be made to the flow schedule, if monitoring data indicate that it is necessary.

For amphibian monitoring, we recommended in the draft EA that monitoring occur on the frequency specified by the Forest Service. However, after discussions during the November 28, 2006, section 10(j) meeting, we now agree with the frequency specified by Interior. There are sensitive amphibian species in the reach (specifically, FYLF), and they should be monitored annually to ensure that adverse effects are not occurring.

For riparian vegetation, monitoring beginning in year 5 of the new flow regime, following a baseline survey prior to implementation, would document the initial response of riparian vegetation, while allowing the riparian system time to respond to the new conditions. Monitoring frequency subsequent to the initial monitoring would be conducted every 5 years, a sufficient sampling interval to identify any changes that may occur. Vegetation changes after the first 5 years would likely be slower than during the initial period.

The costs for the monitoring programs would vary depending on the frequency and intensity of sampling. The following summarizes the annualized costs for the monitoring programs recommended by staff and the agencies:

Program	Staff recommended	Interior recommended	Forest Service specified
Fisheries	\$15,260	\$22,180	\$10,120
Macroinvertebrates	\$10,390	\$15,000	\$6,970
Amphibian	\$12,940	\$12,940	\$7,600
Riparian vegetation	\$10,490	No recommendation	No recommendation

This shows that the staff-recommended programs for fisheries and macroinvertebrates are about midway in costs between the Interior and Forest Service programs, and the same cost for the amphibian program recommended by Interior, because we are recommending the same sampling frequency. We conclude that the costs for these monitoring programs are reasonable and the information that would be generated would be worth the cost.

Invasive Weeds

The Forest Service specified that PG&E should prepare an invasive weed management plan developed in consultation with the Forest Service, the county agricultural commissioner, and CDFR. The purpose of this plan would be to address both aquatic and terrestrial invasive weeds within the project boundary and adjacent to project features directly affecting NFS lands, including roads and distribution and transmission lines. We concluded that the plan should logically apply to all project lands, whether they are Forest Service or PG&E lands. We concluded that attempts to eradicate population units that are already well-established and close to other population units, would not likely succeed, except at unacceptably high cost to other resource values. Therefore, we agree with PG&E and the Forest Service that control may be a more realistic goal. Similarly, we agree that while control within 12 months of detection is a desirable goal, it is likely that there may be instances when this goal is unattainable. The estimated annualized cost for this recommended invasive weed management plan is \$32,270. This would be a moderate cost to the project but would provide adequate protection to native plant species within the project boundary.

Special Status and Listed Species

A number of state listed and state species of concern, federally listed, and Forest Service sensitive species occur within the project area or have the potential to occur. An active bald eagle nest is located just across the NFFR from the Poe powerhouse. The Forest Service specifies (final 4(e) condition no. 35) that annual reviews of the list of special status species occur, in consultation with the Forest Service, to determine if any newly listed species or unsurveyed suitable habitat for the species is likely to occur on NFS lands directly affected by project operations. If it is determined that the species is likely to occur, then PG&E would develop and implement a study plan in consultation with the Forest Service to assess the effects of the project on the species. PG&E would prepare a report including resource measures and file it with the Forest Service and the Commission for approval, prior to implementation of approved resource management measures. The Forest Service also specifies and Interior recommends that the Bald Eagle Management Plan be updated and implemented for the Poe powerhouse area, and that annual monitoring of the effects of any new recreation facilities on sensitive species be performed.

We agree that these measures should be implemented for the continued protection of sensitive and listed species in the project area. We also conclude, however, that the annual review and potential study plans should be done for all lands within the project boundary. Expanding the surveys to include all lands within the project boundary would provide the same level of monitoring and protection for special status species throughout the project area on lands under Commission jurisdiction. Recreational enhancements are proposed for the project area, which could result in increased recreational use of the area, and increased disturbance of sensitive species or their habitat. The bald eagle nest near the powerhouse has been successful for a number of years, but increased recreational use near the powerhouse has some potential to disturb this nest. Our recommended minimum flow regime could also affect the habitat of some sensitive species (particularly amphibians), so continued monitoring would be appropriate. Although the total cost of all these measures cannot be estimated (because of the unknown number of future surveys that may occur), we have estimated that updating the Bald Eagle Management Plan would have an annualized cost of \$5,730, and the annual review of the list of special status species would have an annualized cost of \$1,490. The management plan should be consistent with current national Bald Eagle guidelines. The benefits of updating the Bald Eagle Management Plan and annually reviewing the list of special status species would be worth the costs of these activities.

Recreational Enhancements

PG&E is proposing several recreational enhancements in the project area, and some of the commenting parties are specifying or recommending additional enhancements, including the release of whitewater boating flows into the Poe bypassed reach. We agree that there is a need for recreational enhancements in the project area, which is in a particularly scenic reach of the NFFR, and these enhancements would likely be utilized immediately by recreational users. We are recommending most of the measures proposed by PG&E and some of the measures specified or recommended by other parties, but are not recommending other measures, including the provision of whitewater boating flows in the Poe bypassed reach. Our discussion will focus on additional measures recommended by staff, but not proposed by PG&E, and those measures proposed by PG&E and specified or recommended by others, but not recommended by staff.

Additional Measures Recommended By Staff

Additional measures we recommend include:

- preparing a recreation management plan for Commission approval;
- conducting a feasibility study on improving an existing abandoned trail between Bardee's Bar and the Poe powerhouse road, and comparing the results of this study with the information provided in PG&E's September 2006 feasibility report

on modifying the abandoned construction road for use as a trail, and based on the results of the study, developing an all-weather hiking trail in one of the two locations;

- implementing measures to improve and protect public access for angling, such as additional public parking, public rest rooms, and public hiking trails to allow anglers to safely access the NFFR; and
- providing stream flow information from gage NF23 to the public via a toll-free phone number and/or via the Internet.

We recommend the development of a recreation management plan, as recommended by Interior (section 10(j) recommendation no. 8) and Butte County, and specified by the Forest Service in preliminary section 4(e) condition no. 29, because a plan, which does not exist at this time, would provide direction for the coordination of the development, management, and maintenance of recreational opportunities and facilities associated with the project. Also, developing a recreation plan would help ensure that the development and management of recreational facilities are coordinated with other resource management plans for the project area and would provide the means to address capacity issues and measures to control dispersed use that would, in turn, help limit the adverse effects of recreational uses on project-area resources. A recreation plan would include sufficient detail to assess the recreational facilities, the effects of recreational use on the project area's resources, and recreational-use capacity issues, and provide the opportunity for consulting with interested parties and adjusting recreational facility development and management over the term of a new license. We recommend that PG&E develop a recreation plan in consultation with the appropriate federal, state, and local agencies (including, but not limited to, the Forest Service, FWS, NMFS, the Water Board, Cal Fish and Game, CDBW, and Butte County). We estimate that the annualized cost for preparation of a recreation management plan would be \$1,450, and the benefits of having such a plan would be worth the minimal cost.

Several entities recommend development of hiking trails in the vicinity of the project. Table 36 summarizes these recommendations.

We recognize the need to develop opportunities for hiking in the project area but have obtained limited information on the trail recommended by Michael Taylor. Therefore, we recommend conducting a feasibility study on improving the trail between Bardee's Bar and the Poe powerhouse road and comparing the results of this study with the information provided in PG&E's September 2006 feasibility report on modifying the abandoned construction road for use as a trail. We estimate the cost of conducting this study would be approximately \$10,000 (annualized cost of \$1,450), but the information obtained through this study would allow the Commission to make an informed decision on the best option for providing hiking opportunities in the project area. Based on the results of the study, we recommend developing an all-weather hiking trail in one of the

Table 36. Trails proposed in the vicinity of the Poe Project. (Source: Staff)

Trail Location	Length of trail	Advantages	Disadvantages	Estimated cost	Proposed by
Along the NFFR from Bardee's Bar to Poe Beach	3 miles	Improved river access	Not enough room on east side of NFFR for both the railroad and a trail. Western shoreline has slopes > 20%, possibility for erosion and slope failure	\$9.56 million	Butte County
North of Bardee's Bar: an existing abandoned construction road between Bardee's Bar and an improved scenic point downstream of Highway 70 bridge	2 miles	Appropriate surface for hiking trail	Little aesthetic value; difficult to improve due to numerous rock slides and vegetation growth	\$530,000	Butte County
Downstream of Bardee's Bar, along the NFFR almost to the Poe powerhouse access road	2.8 miles	Provides access to the NFFR; year-round accessibility aesthetically pleasing; away from Hwy 70 and the railroad	Route crosses 2 private parcels not owned by PG&E and may require easements	\$50,000	Michael Taylor

locations, if feasible. The capital cost of developing a hiking trail is estimated to be \$50,000, with an annualized cost of \$9,270; however, a new trail would address the need to increase hiking opportunities in the project area, which justifies the costs.

The Anglers Committee recommends implementing measures to improve and maintain public parking areas, public rest rooms, and public hiking trails for anglers. We agree that these measures would provide added benefits to recreational users at the project and, as such, we already are recommending recreational enhancements at Sandy Beach, Bardee's Bar, and Poe powerhouse, including improved parking and rest room facilities. These facilities would be available to anglers as well as other recreationists. Maintenance of these facilities should be part of PG&E's normal maintenance activities for the recreational facilities, and as such, we have not estimated a separate cost for those activities.

Providing streamflow information via the Internet or a toll-free number would be beneficial, allowing recreational users such as anglers and boaters to obtain river flow information prior to going to the river, and to appropriately plan their river outing. As described in section V.C.5, *Recreational Resources*, of this final EA, flows suitable for whitewater boating in the Poe bypassed reach are typically between 500 and 2,500 cfs while lower flows are usually preferred by anglers. Readily available river flow information would allow users to determine whether conditions are suitable for their activities, prior to leaving for the river. We estimate that this measure would have an annualized cost of \$1,730, and the benefits of providing the river flow information would be worth the cost.

Measures Not Recommended by Staff

We do not recommend the following measures:

- Forming a recreation committee whose focus is solely on the Poe Project.
- Constructing and maintaining recreational facilities in the vicinity of the Cresta powerhouse, as proposed by PG&E and recommended by Butte County and the Forest Service in its preliminary section 10(a) recommendation no. 29D.
- Providing recreational enhancements at Sandy Beach in addition to those proposed by PG&E, including a second restroom, as specified by the Forest Service in its preliminary section 4(e) condition no. 29E and recommended by Butte County.
- Providing recreational enhancements at Bardee's Bar in addition to those proposed by PG&E, including additional picnic tables and fire rings, and road maintenance as necessary, as recommended by Butte County.

- Constructing and maintaining a 3-mile-long trail between Bardee's Bar and Poe Beach, as recommended by Butte County.
- Providing recreational enhancements at Poe Beach in addition to those proposed by PG&E, including a trail along the east side of the NFFR channel and directional signs for boaters, as recommended by Butte County.
- Providing recreational enhancements at the Poe powerhouse in addition to those proposed by PG&E, including additional parking and a trail on the east side of the NFFR, as recommended by Butte County.
- Providing annual funding to the Forest Service for a river ranger position, as specified in its preliminary section 4(e) condition no. 30.
- Providing a one-time contribution of seed money to a government agency or non-profit organization for possible development of a visitor center in the Feather River canyon, as recommended by PG&E and the Forest Service in its preliminary section 10(a) recommendation no. 29H.
- Establishing and maintaining a cooperative program for management of recreational use, law enforcement, and emergency communication at the Poe Project; as recommended by Butte County.
- Inventorying and removing any debris in the project reach that is a risk to public health and safety in cooperation with Caltrans and Union Pacific, as recommended by Butte County.
- Providing recreational flow releases in the Poe bypassed reach, as recommended by Butte County and the Boating Groups.
- Establishing and funding a Recreation Account as part of a "North Fork Feather Enhancement Fund" to be used for enhancement of river recreation in the Feather River Basin and elsewhere in Butte County, as recommended by Butte County and the Boating Groups.

PG&E proposed and the Forest Service, Butte County, American Whitewater, and Risa Shimoda recommended recreational enhancements near the Cresta powerhouse. PG&E also proposed recreational enhancements at Shady Rest. While we agree that providing recreational enhancements at these two locations would benefit recreation in the Feather River canyon, we do not recommend them because we also recognize that both of these sites are either within the Rock Creek-Cresta Project boundary or immediately adjacent to it and, therefore, any improvements at these sites should be provided within the context of the Rock Creek-Cresta Project license.

We recommend some recreational enhancements at Sandy Beach, near Bardee's Bar (including a new 2-mile-long trail), at Poe Beach, and at the Poe powerhouse, but other parties are recommending other enhancements at these locations, some of which we do not believe are justified by the current use at the sites. Our recommended enhancements are essentially the same as proposed by PG&E and specified by the Forest Service; however, the Forest Service has specified that PG&E install two portable toilets at Sandy Beach and we are recommending the installation of one. We agree that providing a restroom facility would improve user comfort and enjoyment and address sanitation issues at the site, but after reviewing current usage and demand, we are not convinced of the need for two restrooms at the site at this time. Many enhancements proposed by Butte County are not included in our recommendations because of a lack of need. While the costs for measures recommended by Butte County would not be significantly higher (except for the 3-mile-long trail, as indicated above, at an estimated capital cost of \$9.56 million), the current recreational usage at the sites is generally light, and there appears to be little justification for expanding the facilities at this time to the extent recommended by the county. We note that the Commission requires most licensees to prepare and submit a FERC Form 80 (Licensed Hydropower Development Recreation Report) every 6 years during the license term (*see* 18 CFR 8.11). Each Form 80 must describe a project's recreation facilities and the level of public use. The Commission uses the information to: (1) inventory the recreational facilities located at licensed projects; (2) ascertain whether projects are meeting the public's recreation needs; and (3) identify where additional efforts should be made to meet future needs. This process can be used to determine if additional or expanded facilities become needed in the future.

Funding for a river ranger has been specified by the Forest Service, and apparently agreed to by PG&E, but we see no indication in the record that there is a need for such a position, in light of the enforcement already provided by Butte County and the Forest Service. This measure would have an annual cost of \$12,000, is not needed, and we do not recommend it as a license condition.

PG&E proposed and the Forest Service recommended seed money (\$250,000 one-time contribution) for a visitor center in the Feather River canyon. We are not recommending that PG&E make such a one-time contribution. While we agree that providing a visitor center would enhance visitor opportunities in the area, we do not believe that such a center can be tied directly to the project and that PG&E should be required to provide seed money.

Butte County's recommendation to maintain a cooperative program for management of recreational use, law enforcement, and emergency communication at the Poe Project would also have PG&E contribute \$120,000 per year to fund one law enforcement officer in the project area. We do not believe that PG&E should be required to fund law enforcement activities in the project area. That is the responsibility of county or state government, and PG&E already pays property taxes to fund such activities. Also,

there is no indication that additional law enforcement is needed in the project area. PG&E, however, is responsible for the security of project facilities.

Butte County and the Boating Groups recommend that PG&E fund a Recreation Account as part of a "North Fork Feather Enhancement Fund" to be used for enhancement of river recreation in the Feather River Basin and elsewhere in Butte County. The initial contribution by PG&E would be \$5,000,000, followed by annual contributions of \$500,000. We find no basis for requiring PG&E to provide such funding for facilities that may enhance visitor opportunities elsewhere in the basin but have little or no nexus to the Poe Project. We note that we are recommending PG&E provide significant recreational measures, including recreational improvements at Sandy Beach, Bardee's Bar, Poe Beach, and Poe powerhouse; provide an improved scenic viewpoint along State Highway 70; provide an all-weather hiking trail between Bardee's Bar and an improved scenic area downstream of the State Highway 70 bridge; improve parking and access trails for anglers; provide streamflow information to the public from gage NF23; and prepare a recreation management plan for project area recreational opportunities.

Butte County recommends that PG&E remove any debris in the project reach; however, there is no indication that significant man-made debris related to the project exists and may affect safe navigability of the reach. Most of the hazards to navigation are natural (boulders and ledge). Therefore, we are not adopting Butte County's recommendation.

We do not recommend recreational flow releases in the Poe bypassed reach as proposed by Butte County and the Boating Groups. While providing recreational boating flows would enhance recreational opportunities in the Poe bypassed reach, the extent of boater usage that would actually develop there is unknown. We note that similar whitewater boating opportunities are available just upstream at the Rock Creek-Cresta Project and also have been proposed at the UNFFR Project. We also note that any increased demand for recreational boating in the area can be met through the adaptive provision of additional recreational flow release dates at those projects, as discussed in section V.C.5. In addition, the economic cost of these boating releases would be high (\$343,380 annually) due to the loss of energy generation.

We also are concerned about the potential effects of such flows on other resources in the reach. Although no site-specific studies have been conducted to assess those effects, results of studies conducted just upstream at the Rock Creek-Cresta Project are likely transferable to the Poe reach. As discussed in section V.C.3, there are sensitive species located in the project area (such as FYLF) that could be negatively affected by both the provision of higher boating flows in the bypassed reach and by a substantial increase in visitors at the launch sites and take out locations in the reach. Whitewater recreation pulse flows, if provided during the FYLF reproductive season, would be likely to adversely affect the NFFR FYLF population because: (1) the Poe reach subpopulation appears to be critical to the continuation of this species in the NFFR; (2) PG&E cannot

effectively control ramping rates at the Poe and Rock Creek-Cresta dams at this time; (3) mortalities have been observed as a direct result of pulse flows; (4) herpetologists attribute Cresta reach population declines to whitewater recreation releases; (5) controlled experiments demonstrate direct and indirect effects of flow fluctuations and sustained high flows; and (6) the cumulative effects of hydropower operations on the NFFR FYLF population are unknown.

In light of the economic and environmental costs of the recreational boating flows, and the questionable need for additional whitewater boating opportunities in the project area, we do not recommend the flows.

Land Use and Aesthetics

For land use and aesthetics, we are recommending preparation and implementation of: a road management plan (as specified in the Forest Service's preliminary section 4(e) condition no. 40); a fire prevention and response plan (as specified in the Forest Service's final section 4(e) condition no. 8); a fuel treatment plan (as specified in the Forest Service's preliminary section 4(e) condition no. 32); a Bardee's Bar tunnel spoil pile revegetation plan (as specified in the Forest Service's preliminary section 4(e) condition no. 33); and a visual management plan (as specified in the Forest Service's preliminary section 4(e) condition no. 39). We are expanding the geographic scope for conditions 8 and 32 to include all lands within the project boundary. These plans would ensure that land uses and aesthetics are protected within the project boundary by maintaining project area roads in a manner compatible with other land uses, providing measures to reduce the potential for forest fires within the project boundary, and taking into consideration the aesthetics of the project area in any other activities involving construction or land disturbance. The total annualized estimated cost of these five plans would be \$7,260, but the benefit of enhanced land uses and aesthetics would justify the costs.

PG&E has proposed new recreational facilities (see section V.C.5, *Recreational Resources*) at Sandy Beach, Bardee's Bar, and Poe Beach which would be used as primary access points to the Poe bypassed reach. As such, a clear connection exists between project operations and recreational use of these facilities. Additionally, PG&E has proposed a scenic viewpoint at a pullout on State Highway 70, which would provide a view of the Poe Project bypassed reach, including Bardee's Bar, the location of an informal recreation area that provides access to a portion of the NFFR. We therefore recommend that all of these facilities be included in the project boundary to provide assurance that improvements would be consistent with project purposes, and that PG&E, in cooperation with the Forest Service and Butte County, continue to provide recreational access to project lands and waters. There should be no additional cost associated with any boundary changes. Specifically, the facilities we recommend including in the project boundary are Sandy Beach, Bardee's Bar, the Bardee's Bar trail, Poe Beach, and the scenic viewpoint along State Highway 70. We also recommend that the last 1.19 miles of

Bardee's Bar Road located on PG&E land be included in the project boundary. We do not recommend including all of Bardee's Bar Road in the project boundary because it is also used for Union Pacific Railroad operations and to access private dwellings, as well as NFS land, and is used only incidentally for project purposes. Bardee's Bar Road terminates at Bardee's Bar, which is also recommended for inclusion in the project boundary, and it would be appropriate to include a portion of the access road in the project boundary as well.

Regarding the proposed inclusion of Big Bend dam into the Poe project boundary, our analysis, (section V.C.6) indicates that the dam serves Poe project purposes by maintaining the necessary tailrace elevation to support the operation of Poe powerhouse's Francis turbines, and by re-regulating Poe powerhouse discharges to limit downstream flow fluctuations that could adversely affect aquatic biota and public safety. As such, we recommend that Big Bend dam be made a licensed feature of the Poe project and that the project boundary be re-drawn accordingly.

Cultural Resources

Based upon the Forest Service's preliminary terms and conditions, comments from the Mechoopda, and our analysis, we will revise our PA to have PG&E file a final HPMP within six months after license issuance. In consultation with the Forest Service, SHPO, and involved Indian tribes, PG&E would craft a final HPMP that would be a free-standing document that includes a more detailed set of procedures and protocols on what steps they would take to avoid adverse effects on CA-BUT-42H and CA-BUT-1665H, and the procedures and protocols they would use to consult with the Forest Service, SHPO and tribes in carrying out their responsibilities related to the HPMP. In particular, PG&E should allow for more frequent monitoring of impacts to CA-BUT-42H and CA-BUT-1665H, than the proposed one visit to each site per year, and the specifics in the visitation and monitoring of these sites should be incorporated in the final HPMP in consultation with the Forest Service, SHPO, and involved tribes. The final HPMP should also include all relevant background and supporting information derived from the inventory aspect of the CRIMP and conform to the Commission and Advisory Council on Historic Preservation guidelines for the preparation of HPMPs (FERC and ACHP, 2002). We would also expect that the final HPMP would provide for coordination with the development and implementation of any recreation plan that would be prepared by PG&E and would specify that construction drawings include the locations of historic properties that should be avoided during any ground-disturbing activities. Filing the HPMP for Commission approval would ensure protection of cultural resources, and at an estimated annualized cost of \$2,450, would be worth the cost.

The Commission staff will prepare and circulate for review and comment a final PA among the Commission, SHPO, Forest Service, Greenville Rancheria, Berry Creek Rancheria, Enterprise Rancheria, Mooretown Rancheria, Mechoopda Indian Tribe, and Concow band of Maidu that would address project-wide compliance with section 106 of

the NHPA. The final PA would require filing of a final HPMP within 6 months of the issuance of any license for the project.¹³

The Commission's PA also would require that historic properties be managed over the term of any new license according to the final HPMP. Implementation of the measures outlined in the PA and the final HPMP would ensure that historic properties are afforded adequate protection.

B. CONCLUSIONS

From our evaluation of the environmental effects and public benefits of the project, we conclude that licensing the Poe Project, with our recommended environmental protection measures, would best adapt the project to a comprehensive plan for the waterway. The proposed project, with staff-recommended modifications and additional measures, would generate an average of 553,053,000 kWh of electricity annually, which has a net annual benefit of about \$23,497,310.

VIII. RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Section 10(j) of the FPA¹⁴ requires the Commission to include license conditions, in each hydroelectric license issued, that are based on recommendations provided by the state and federal fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. Moreover, section 10(j) states that, whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. If the Commission still does not adopt a recommendation, it must explain how the recommendation is inconsistent with Part I of the FPA or other applicable law and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources.

In response to the Commission's REA notice dated February 8, 2005, Interior (on behalf of FWS), NMFS, and Cal Fish and Game filed letters providing comments, as well as recommendations, for the Poe Project, pursuant to section 10(j).¹⁵ By letter dated

¹³In response to our draft PA, the Advisory Council on Historic Preservation has commented in writing that it believes its involvement with this PA is not needed (see Advisory Council letter to FERC, dated February 3, 2006).

¹⁴16 U.S.C. §803(j)(1).

¹⁵Interior's letter was dated March 30, 2005, and NMFS and Cal Fish and Game letters were dated April 8, 2005.

December 12, 2005, however, NMFS withdrew its section 10(j) recommendations, but reserved its authority to prescribe fishways pursuant to section 18 of the FPA. Therefore, we only consider the recommended terms and conditions filed by Interior and Cal Fish and Game. Table 37 lists the agencies' 10(j) recommendations. Table 37 also summarizes our analysis of those recommendations, including whether the recommendations are adopted under the staff alternative. Recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA. Following issuance of the draft EA, we met with Cal Fish and Game, Interior, and other interested entities on November 28, 2006, in Sacramento, California, to attempt to resolve inconsistencies of the agency recommendations with the FPA. Some inconsistencies were resolved, and table 37 reflects our final analysis of the fish and wildlife agency recommendations, followed by a description of the resolutions reached at the meeting.

Table 37. Analysis of state and federal fish and wildlife agency recommendations for the Poe Project. (Source: Staff)

Recommendation	Agency	Within the Scope of 10(j)?	Annualized Cost	Staff Recommending?
1. Water temperature maintenance, moderation and monitoring plan ^a	Interior, Cal Fish and Game	Yes	\$2,180	No, although we are recommending a summer water temperature monitoring program to evaluate the effects of higher instream flows on water temperatures
2. Implement actions to meet the water temperature moderation criteria range program ^a	Interior, Cal Fish and Game	Yes	\$971,020	No, temperature modeling indicated that WTM flows would not achieve objectives
3. Instream flow releases for the Poe bypassed reach ^a	Interior, Cal Fish and Game	Yes	\$3,529,360	No, but staff is recommending an alternate seasonal minimum flow regime
4. Streamflow gaging management plan	Interior	No	\$1,450	Yes

Recommendation	Agency	Within the Scope of 10(j)?	Annualized Cost	Staff Recommending?
5. Operate and maintain existing gage NF23 and implement the streamflow gaging management plan	Interior	No	\$1,000	Yes
6. Pulse flow releases for the Poe bypassed reach (12 hour) ^a	Interior	Yes	\$13,040	No, but we've recommended an alternative 24-hour interim pulse flow and associated study
7. Pulse flow releases for the Poe bypassed reach (72 hour) ^a	Cal Fish and Game	Yes	\$39,120	No, but we recommend an alternative 24-hour interim pulse flow and associated study
8. Pulse flow monitoring for the Poe bypassed reach	Interior	Yes	\$7,270	Yes
9. Monitoring of effects of new instream flows in the Poe bypassed reach ^a	Interior, Cal Fish and Game	Yes	\$1,090 (only reflects cost of plan)	No, but we are recommending a comprehensive report every 6 years to discuss and present results of all monitoring conducted since previous report, along with supplemental annual reports
10. Ramping rate plan	Interior, Cal Fish and Game	Yes	\$2,910	Yes
11. Implement ramping rates ^a	Interior	Yes	\$14,980	Yes, but we are recommending interim rates that differ slightly from Interior's

Recommendation	Agency	Within the Scope of 10(j)?	Annualized Cost	Staff Recommending?
12. Develop and implement a fisheries monitoring plan ^a	Interior	Yes	\$22,180	Yes, except we recommend a sampling frequency beginning in years 4 and 5 after license issuance
13. Develop and implement a macroinvertebrate monitoring plan ^a	Interior	Yes	\$15,000	Yes, except we recommend a sampling frequency beginning in years 4 and 5 after license issuance
14. Evaluation of Poe Reach biological monitoring programs ^a	Interior	Yes	\$650	No, although our recommended monitoring plans would provide the same information and would have specific objectives and decision points for any modification to the measures
15. Evaluation of rainbow trout tributary access ^a	Interior, Cal Fish and Game	No	\$20,000	Yes
16. Fish passage feasibility study at the Poe Project	Interior	No	\$7,270	No. Feasibility study already conducted by PG&E
17. Develop and implement an amphibian monitoring plan ^a	Interior	Yes	\$12,940	Yes
18. Update the Bald Eagle Management Plan for the Poe powerhouse area	Interior	Yes	\$5,730	Yes

Recommendation	Agency	Within the Scope of 10(j)?	Annualized Cost	Staff Recommending?
19. Comply with any Biological Opinion issued for the project pursuant to section 7 of the ESA	Interior	No	Unknown	Yes. We will comply with the provisions of the ESA.
20. Prepare recreation management plan	Interior	No	\$1,450	Yes

^a Recommendation discussed at November 28, 2006, section 10(j) meeting.

A. RECOMMENDATIONS PURSUANT TO SECTION 10(j) OF THE FPA

Under the provisions of section 10(j) of the FPA, we make the determination that the agencies submitted 14 recommendations that fall within the scope of section 10(j). We recommend adopting measures consistent with a number of these recommendations, but we do not recommend 8 of the measures precisely as recommended by the agencies. In some instances we recommend a similar recommendation from the other 10(j) agency, or a similar 4(e) condition from the Forest Service.

We do not recommend adopting the Interior and Cal Fish and Game recommendations for a Water Temperature Maintenance, Moderation and Monitoring Plan, and for implementing a water temperature moderation criteria range program (recommendations 1 and 2 in table 37). Our analysis shows that it is unlikely that any measures could be implemented at the Poe Project (either alone or in combination with other measures) that would be successful in consistently meeting the maximum temperature target for the Poe reach (20° C) during the summer months. Although the WTM flows can provide additional benefits over the recommended instream flows under some conditions, in most instances it requires high volumes of spillage at Poe dam that would have adverse effects on other resources in the reach and on project power production and economics. The FYLF occurs in the Poe bypassed reach, and higher flows during the summer months could adversely affect egg masses and tadpoles, by flushing these life stages from suitable habitat and resulting in mortalities for this sensitive species. WTM flows would also result in a loss in generation of 16,000,000 kWh costing \$973,200, which would be substantial for measures that may not achieve the stated objectives. We discussed these recommendations during the November 28, 2006, section 10(j) meeting. Interior and Cal Fish and Game indicated that the recommendation for a WTM program is withdrawn, conditioned on staff's adoption of the revised agency flow regime, which was designed to provide similar water temperature moderation. We

agreed to fully analyze the revised agency flow regime in the final EA, but following our analysis we do not recommend adopting the revised agency flow regime, nor the WTM program for the reasons previously cited. For these reasons, we determined that these recommendations are inconsistent with the public interest standard of section 4(e) and the comprehensive planning standard of section 10(a) of the FPA.

We do, however, recommend a summer water temperature monitoring program in the reach to determine the changes in water temperature associated with our recommended new instream flow regime, and to monitor influent water temperatures. This program would provide much of the same information as the program developed under the Interior and Cal Fish and Game recommended plan. Our recommended monitoring program would have an annualized cost of \$50,000 and is more appropriate given that we do not recommend the WTM flows.

We do not recommend adopting the revised minimum flow regime recommended by Interior and Cal Fish and Game, which would result in minimum flows ranging from 150 to 500 cfs, under their revised proposal, depending on water year type and month. Staff identified an alternative seasonal minimum flow regime that would provide flows of 150 to 300 cfs, which would also vary by water year type and by month. The staff alternative would provide a moderate level of aquatic habitat enhancement, somewhat less than what would be provided with the revised agency-recommended flow regime, but still substantially more habitat than occurs under the current minimum flow regime. The staff alternative would also result in a substantial cost savings to the project compared to the agency flow regime, because of reduced energy losses. The staff-recommended flow would result in energy losses of 29,180,000 kWh at an annual cost of \$1,639,920, compared to an energy loss of 62,800,000 kWh and cost of \$3,529,360 for the agency-recommended flow. This recommendation was also discussed at the section 10(j) meeting, where we agreed to fully analyze the revised agency flow recommendation in the final EA. Following our analysis, we do not recommend adopting the revised agency flow regime for the reasons previously cited. Therefore, we find that the Interior and Cal Fish and Game minimum flow recommendation is inconsistent with the public interest standard of section 4(e) and the comprehensive planning standard of section 10(a) of the FPA.

We do not recommend adopting the pulse flow schedule recommended by Cal Fish and Game for the bypassed reach (recommendation 7 in table 37). Cal Fish and Game's recommended 72-hour pulse flow would have a greater chance of adversely affecting other resources in the reach, because the longer duration flow would have a greater chance of mobilizing larger gravel substrate in the reach, potentially redistributing or flushing downstream the limited amount of gravels now occurring in the reach. This in turn could affect rainbow trout spawning, if less spawning gravel is available, and could affect macroinvertebrate production through the loss of suitable substrate. A 72-hour pulse flow would also result in a loss of 696,000 kWh of generation at an annualized

cost of \$39,120. Alternative pulse flows of 12 hours or 24 hours would have a lower potential for adversely affecting other resources, and would have less of an impact on project economics. A 12-hour pulse flow would result in a loss of 232,000 kWh of generation costing \$13,040, while a 24-hour pulse flow would result in a loss of 365,000 kWh of generation costing \$20,510. Therefore, we find that Cal Fish and Game's recommendation is inconsistent with the public interest standard of section 4(e) and the comprehensive planning standard of section 10(a) of the FPA. However, we discussed this recommendation and other alternatives for pulse flows at the section 10(j) meeting. We indicated that we would consider any additional information provided on this topic in the final EA, and would look at possible adaptive management options. We also indicated that a pulse flow plan would likely be a reasonable alternative to help determine an effective pulse flow schedule for the Poe Project. Thus, we now recommend an interim pulse flow schedule and a pulse flow study to evaluate the appropriate thresholds for the successful redistribution of fine-grained sediment from spawning gravels in the bypassed reach. We recommend a 2,000-cfs pulse flow in dry and critically dry water years if by February 10, a natural or operational related spill of that magnitude has not occurred in the preceding 18 months. Interim pulse flows would last for 24 hours and would be ramped up and down at our recommended ramping rates. To protect rainbow trout that may have begun spawning, the pulse flow release would occur prior to February 15. Pulse flows would not occur if two successive days of water temperatures have exceeded 10° C, or if rainbow trout spawning has been observed by Cal Fish and Game or other entities. We conclude that our interim pulse flow schedule would provide the same geomorphic and sedimentologic benefits (e.g., recruitment and distribution of spawning gravels, flushing of fines) associated with periodic high flows as those flows recommended by Cal Fish and Game, at a lower cost (\$20,510). Our recommended study would allow the applicant and involved stakeholders to better identify a long-term pulse flow strategy specific to the Poe bypassed reach.

We do not recommend adopting Interior's 10(j) recommendation 1(c) and Cal Fish and Game recommendation 7 for instream flow effects monitoring, which calls for the submission of a plan to monitor the effects of new instream flow schedules on the project's fish and wildlife resources (recommendation 9 in table 37). This plan and any monitoring conducted under it would be duplicative of the staff-recommended biological monitoring for the Poe reach that would include monitoring of fish populations, macroinvertebrates, amphibians, and riparian vegetation. Results from these studies would allow PG&E and the resource agencies to assess the response of the project's fish and wildlife resources to the implementation of our recommended instream and pulse flow schedules, as is the stated intent of the agencies' 10(j) recommendation. Although the cost for submitting a plan to monitor the effects of the new minimum flows would be small (\$1,090), this plan would not be needed in light of the monitoring programs recommended by staff. There would be no need to duplicate efforts and costs to provide the same results. Therefore, we find that Interior's and Cal Fish and Game's recommendation is inconsistent with the public interest standard of section 4(e) and the

comprehensive planning standard of section 10(a) of the FPA. This recommendation was discussed at the section 10(j) meeting, where the agencies agreed with the monitoring programs recommended by staff if a comprehensive annual report was required that reported on all monitoring studies. We initially agreed that an annual report would be an appropriate requirement, but after further analysis we now recommend a comprehensive report every 6 years, because not all the monitoring studies would occur on an annual basis (some would occur every 5 years). In addition, a 6-year comprehensive report is consistent with Interior's recommendations made by letter dated March 30, 2005, in response to the REA notice, for a comprehensive review of the effects of project minimum flows every 6 years. However, we agree that there should also be supplemental annual reports, to report results of any monitoring studies that do occur on an annual basis or occur during years between the 6-year reports.

We do not recommend adopting Interior's 10(j) recommendation for evaluation of Poe Reach biological monitoring program results (item 14 in table 37), with possible later revisions to the instream flow schedule, based on monitoring results. We are already recommending that PG&E implement biological monitoring programs for fish, macroinvertebrates, and amphibians, and these plans would have specific objectives and decision points for any modification to the measures provided for these resources. Although the annualized cost of Interior's recommendation would be relatively small (\$650), there would no need to duplicate our recommended provisions with another measure to provide the same results. Therefore, we find that this recommendation for evaluation of Poe Reach biological monitoring program results lacks substantial evidence and is inconsistent with the public interest and comprehensive planning standards of sections 4(e) and 10(a) of the FPA. This recommendation was discussed at the section 10(j) meeting, where we stated that we would consider appropriate adaptive management programs in our final analysis of required monitoring programs, which we do in the final EA.

We did not recommend adopting Interior's 10(j) recommendation for an annual amphibian monitoring plan (schedule only; item 17 in table 37) in the draft EA, but instead recommended Forest Service's specified schedule (preliminary 4[e] condition) of alternate-year monitoring. However, following discussion of this issue at the section 10(j) meeting, we now recommend Interior's schedule of an annual monitoring program. This would be appropriate because of the presence of a sensitive species in the reach (FYLF). In addition, the Forest Service indicated that it would be specifying annual amphibian monitoring, including stranding and rescue efforts for the duration of the license in a future 4(e) filing.

Other recommendations discussed at the section 10(j) meeting included the Cal Fish and Game recommendation for development of a ramping rate plan and schedule during the first 5 years of the new license (item 10 in table 37), and fisheries and macroinvertebrate monitoring programs (items 12 and 13 in table 37). We had

recommended a specific ramping rate in the draft EA, but not a ramping rate plan, and we had recommended different intervals for fisheries and macroinvertebrate monitoring studies than recommended by Interior. These recommendations were not resolved at the 10(j) meeting, but we are now recommending development of a ramping rate plan, along with interim ramping rates, plus fisheries and macroinvertebrate monitoring studies on a schedule as recommended by Cal Fish and Game. Development of a ramping rate plan would have an annualized cost of only \$2,910, while implementing the interim ramping rates would have an annualized cost of \$14,980. We are recommending fisheries and macroinvertebrate monitoring studies to begin in years 4 and 5 of the license and to continue thereafter at 5-year intervals, but in consecutive years. We estimate the fisheries and macroinvertebrate monitoring studies would have annualized costs of \$22,180 and \$15,000, respectively.

B. RECOMMENDATIONS UNDER SECTION 10(a) OF THE FPA

Section 10(a) of the FPA¹⁶ requires that any project for which the Commission issues a license shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.

Our assessment of the fish and wildlife agency section 10(j) recommendations is that six of the recommendations made by Interior (one of which was also recommended by Cal Fish and Game; see table 37) are not within the scope of section 10(j). However, as is our practice, we considered them under section 10(a) and are recommending five of them. We recommend preparation and implementation of a streamflow gaging management plan, and PG&E's continued operation of the existing gage NF23. We do not consider these to be specific recommendations for the protection, mitigation, and enhancement of fish and wildlife resources, but we do agree that these measures should be implemented so that a good flow record is available for compliance purposes, and for any future adjustments to the instream flow regime based on the biological monitoring study results. Interior also recommends preparation of a recreation management plan, which is not a measure for the protection, mitigation, and enhancement of fish and wildlife resources. We, however, are recommending a recreation management plan for the maintenance and enhancement of recreational facilities and opportunities in the project area. Interior's 10(j) recommendation 5 that PG&E comply with any Biological Opinion issued for the project pursuant to section 7 of the ESA is not a specific measure for the protection, mitigation, and enhancement of fish and wildlife resources. However, the Commission will comply with the provisions of the ESA.

¹⁶16 U.S.C. §803(a)(1).

Interior's 10(j) recommendation 7(b) and Cal Fish and Game recommendation 5, to evaluate rainbow trout access to Mill Creek and Flea Valley Creek, was found to be outside of the scope of section 10(j) of the FPA, because it is not a specific measure for the protection, mitigation, or enhancement of fish and wildlife resources, but rather a study that could have been performed prior to licensing. We did not recommend this study in the draft EA because PG&E already conducted a study of adult spawner access to the creeks in 1999 and provided the results in the license application. We, however, discussed this recommendation in the section 10(j) meeting, where the agencies clarified that their recommendation had more to do with juvenile rainbow trout movement out of the creeks during the summer low-flow months, and adult and sub-adult use of the creeks as coldwater refugia during those months. We agree that this study of the important usage of the creeks by rainbow trout during the summer months should be conducted. If adverse effects are found to be occurring, related to project operations, appropriate mitigative measures could be implemented. We estimate that this study would have an annual cost of \$20,000, but would be worth the cost if adverse effects are detected that can be corrected, resulting in enhancement of the use of these important tributaries by rainbow trout.

Interior's 10(j) recommendation 9 to conduct a fish passage feasibility study for the Poe Project was found to be outside of the scope of section 10(j) of the FPA, because it is not a specific measure for the protection, mitigation, or enhancement of fish and wildlife resources, but rather a study that could have been performed prior to licensing. In fact, PG&E conducted a study of options for fish passage at both Poe and Big Bend dams, which provided a substantial amount of information regarding potential fish passage measures at the Poe Project. Although the annualized cost for this measure would not be high (\$7,270), there is no need to develop information that would duplicate information already provided by PG&E.

Other agencies also made several recommendations under section 10(a) of the FPA, and we discuss these recommendations in detail in section V of this final EA. Our conclusions and recommendations on these other measures are found in section VII.A.

IX. CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by the project. Under section 10(a)(2), federal and state agencies filed plans that address various resources in California. Eighteen plans address resources relevant to the Poe Project:

1. California Advisory Committee on Salmon and Steelhead Trout. 1988. Restoring the balance: 1988 Annual Report. Sausalito, CA.

2. California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Bureau of Reclamation. 1988. Cooperative agreement to implement actions to benefit winter-run chinook salmon in the Sacramento River Basin. Sacramento, CA. May 20. 10 pp. and exhibit.
3. California Department of Fish and Game. 1990. Central Valley salmon and steelhead restoration and enhancement plan. Sacramento, CA. April. 115 pp.
4. California Department of Fish and Game. 1993. Restoring Central Valley streams: a plan for action. Sacramento, CA. November. 129 pp.
5. California Department of Fish and Game. 1996. Steelhead restoration and management plan for California. February. 234 pp.
6. California–The Resources Agency. 1989. Upper Sacramento River fisheries and riparian habitat management plan. Sacramento, CA. January. 158 pp.
7. California Department of Parks and Recreation. 1998. Public opinions and attitudes on outdoor recreation in California. Sacramento, CA. March.
8. California Department of Parks and Recreation. 1994. California outdoor recreation plan–1993. Sacramento, CA. April. 154 pp. and appendices.
9. California Department of Water Resources. 1983. The California water plan: projected use and available water supplies to 2010. Bulletin 160-83. Sacramento, CA. December. 268 pp. and attachments.
10. California Department of Water Resources. 1994. California water plan update. Bulletin 160-93. Sacramento, CA. October. Two volumes and executive summary.
11. California State Water Resources Control Board. 1999. Water quality control plans and policies. Adopted as part of the State Comprehensive Plan. Three enclosures. April.
12. Forest Service. 1988. Plumas National Forest Land and Resource Management Plan. Department of Agriculture, Quincy, CA. August 26. 342 pp. and appendices.
13. Forest Service. 1992. Lassen National Forest Land and Resource Management Plan, including Record of Decision. Department of Agriculture, Susanville, CA. Appendices and maps.

14. Forest Service. 2004. Sierra Nevada forest plan amendment, including final environmental impact statement and Record of Decision. Department of Agriculture, Vallejo, CA. January.
15. Fish and Wildlife Service, California Department of Fish and Game, California Waterfowl Association, Ducks Unlimited. 1990. Central Valley habitat joint venture implementation plan: a component of the North American waterfowl management plan. U.S. Department of the Interior, Portland, OR. February. 102 pp.
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17. Fish and Wildlife Service. Undated. Fisheries U.S.A: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, DC. 11 pp.
18. National Park Service. 1982. The nationwide rivers inventory. U.S. Department of the Interior. Washington, DC. January. 432 pp.

No conflicts were found with these plans.

X. FINDING OF NO SIGNIFICANT IMPACT

If the Poe Project is licensed as recommended by staff, the project would continue to operate while providing enhancements to water quality, fish and wildlife resources, and improvements to recreational facilities in the project area.

Based on our independent analysis, issuance of the license as recommended by staff would not constitute a major federal action significantly affecting the quality of the human environment.

XI. LITERATURE CITED

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APPENDIX A

FOREST SERVICE SECTION 4(e) CONDITIONS

This appendix includes the current section 4(e) conditions filed by the Forest Service. These conditions include the preliminary 4(e) conditions submitted by letter dated April 6, 2005 (except for those superseded by the subsequent filing of final conditions), and the final conditions filed by the Forest Service on September 26 and November 30, 2006. For each condition, we indicate whether it is preliminary or final. We have also removed the section 10(a) recommendations from this listing.



April 6, 2005

Ms. Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **FOREST SERVICE PRELIMINARY 4(e) CONDITIONS
PG&E – Poe Hydroelectric Project FERC No. 2107**

Dear Ms. Salas:

Enclosed for filing are the Forest Service Preliminary Terms and Conditions for inclusion in a new license for the above-named project, as well as comments, recommendations and rationale pursuant to Sections 4(e) and 10(a) of the Federal Power Act. This filing is in response to your notice of “Ready for Environmental Assessment,” dated February 8, 2005.

On February 2, 2004, the Licensee as well as a number of other interested parties including the Forest Service began an informal settlement process for the purpose of resolving project associated resource issues. While progress has been made in resolving a number of issues, informal collaborative discussions have not been completed. Topics such as water temperature management in the Poe reach, water quality, fish passage at Big Bend Dam, recreational boating and additional recreational development are still under consideration. Proposals recently made by American Whitewater and Butte County have not been fully discussed. Any changes resulting from additional discussions will be incorporated into our Final 4(e) Terms and Conditions.

Enclosure 1 contains the Preliminary 4(e) Terms and Conditions found to be necessary for the adequate protection and utilization of the Plumas National Forest. Applicable comprehensive plans include the Plumas National Forest Land and Resource Management Plan (1988), as amended by, the Sierra Nevada Forest Plan Amendment, (January 2004).

Enclosure 2 contains the rationale for the 4(e) mandatory license conditions and 10(a) recommendations found in Enclosure 1. The Forest Service is submitting the rationale for the Preliminary License Terms and Conditions in an effort to provide the FERC with an adequate explanation of the relationship of these measures to comprehensive plan direction and the connection to NFS lands. The submittal is in compliance with the 2001 Interagency Task Force (ITF) “NEPA Procedures in FERC Hydroelectric Licensing” Report.

The preliminary terms and conditions submitted herein are predicated on a new license term of approximately 30 years. The Forest Service believes that simultaneous relicensing of the Poe Hydroelectric Project (FERC Project No. 2107), the Rock Creek-Cresta Hydroelectric Project (FERC Project No. 1962) and the Upper North Fork Feather River Project (FERC Project No. 2105) is in the best interest of the Licensee and the agencies involved in relicensing proceedings. The Forest Service supports a Poe Project license term that facilitates relicensing of the three projects at the same or nearly the same time.

The Forest Service will issue final terms and conditions and supporting information for the Poe Hydroelectric Project within 60 days of publication of the draft Environmental Impact Statement (DEIS) prepared by the Commission, if we determine that the DEIS provides an adequate record to support our Section 4(e) Conditions. If we determine that the record is incomplete at the DEIS stage, the Forest Service will file Final Section 4(e) Conditions within 60 days of publication of the Final EIS.

Due to the complexity of this Project, the Forest Service recommends a “clarification meeting,” as allowed in the ITF documents. Specifically, the Forest Service requests staff review of Section 4(e) conditions as they relate to project features, the project boundary, and National Forest System lands, so that the Forest Service may clarify any conditions that appear to be in conflict with the Commission’s interpretation of Section 4(e) of the Federal Power Act.

Please contact Mike Taylor, Forest Hydroelectric Coordinator, Feather River Ranger District, Plumas National Forest at (530) 532-7427 if you have questions concerning this submittal.

Sincerely,

/s/

Joshua S. Rider

Attorney for the Forest Service

Enclosures

cc: Jim Peña, Forest Supervisor, Plumas NF
Mike Taylor, Feather River Ranger District, Plumas NF
Bob Hawkins, RHAT Service List

Enclosure 1

PACIFIC SOUTHWEST REGION USDA FOREST SERVICE DRAFT TERMS AND CONDITIONS

Poe Hydroelectric Project FERC Project No. 2107

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Poe Hydroelectric Project FERC Project No. 2107

I. Introduction

The Forest Service hereby submits its Draft 4(e) Terms and Conditions (Conditions) and Section 10(a) recommendations, as applicable, for the Poe Hydroelectric Project (FERC Project No. 2107), in accordance with 18 CFR 4.34(b)(1)(i). The Forest Service is also submitting “Recommendations”, as allowed under Section 10(a) of the Federal Power Act. The “Recommendations” are applicable to areas where project effects do not directly affect NFS lands, and are optional for consideration by the FERC, as the lead federal agency. The “Recommendations” are shown in Enclosure 1 as italicized text. The rationale for the “Recommendations” is included in Enclosure 2.

Section 4(e) of the Federal Power Act states the Commission may issue a license for a project within a reservation only if it finds that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. This is an independent threshold determination made by FERC, with the purpose of the reservation defined by the authorizing legislation or proclamation (see *Rainsong v. FERC*, 106 F.3d 269 (9th Cir. 1977)). The Forest Service, for its protection and utilization determination under Section 4(e) of the FPA may rely on broader purposes than those contained in the original authorizing statutes and proclamations in prescribing conditions (see *Southern California Edison v. FERC*, 116F.3d 507 (D.C. Cir. 1997)). These terms and conditions are based on those resource and management requirements enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wilderness Act or the Wild and Scenic River Act), as such laws may be amended from time to time, and as implemented by regulations and approved Land and Resource Management Plans prepared in accordance with the National Forest Management Act. Specifically, the 4(e) conditions are based on the Land and Resource Management Plan (as amended) for the Plumas National Forest, as approved by the Regional Forester of the Pacific Southwest Region.

Pursuant to Section 4(e) of the Federal Power Act, the Secretary of Agriculture, acting by and through the Forest Service, considers the following conditions necessary for the adequate protection and utilization of the land and resources of the Plumas National Forest. License articles contained in the Federal Energy Regulatory Commission’s (hereinafter referred to as the Commission) Standard Form L-1 (revised October 1975) issued by Order No. 540, dated October 31, 1975, cover general requirements. Section II of this document includes standard conditions deemed necessary for the administration of National Forest System lands. Section III covers specific requirements for protection and utilization of National Forest System lands and shall also be included in any license issued.

II. Standard Forest Service Conditions

Condition No. 1—Modification of 4(e) Conditions After Biological Opinion or Water Quality Certification (preliminary condition)

The Forest Service reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion, Section 18 conditions or any water quality certification issued for this Project by the United States Fish and Wildlife Service, National Oceanographic and Atmospheric Administration Fisheries Service, or any Certification issued for this Project by the State Water Resources Control Board.

Condition No. 2—Forest Service Approval of Final Design (preliminary condition)

Before any new construction of the Project occurs on National Forest System lands, the Licensee shall obtain prior written approval of the Forest Service for all final design plans for Project components, which the Forest Service deems as affecting or potentially affecting National Forest System resources. The Licensee shall follow the schedules and procedures for design, review, and approval specified in the conditions herein. As part of such written approval, the Forest Service may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to insure that the Project is compatible with on-the-ground conditions. Should such necessary adjustments be deemed by the Forest Service, the Commission, or the Licensee to be a substantial change, the Licensee shall follow the procedures of Article 2 of the license. Any changes to the license made for any reason pursuant to Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Agriculture made pursuant to Section 4(e) of the Federal Power Act.

Condition No. 3—Approval of Changes (final condition)

Notwithstanding any license authorization to make changes to the project, when such changes directly affect National Forest System lands, the Licensee shall obtain written approval from the Forest Service prior to making any changes in any constructed project features or facilities, or in the uses of project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from the Forest Service, and a minimum of 60-days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of the Forest Service for such changes. The Licensee shall file an exact copy of this report with the Forest Service at the same time it is filed with the Commission. This article does not relieve the Licensee from the amendment or other requirements of Article 2 or Article 3 of this license.

Condition No. 4—Consultation (preliminary condition)

Each year between March 15 and April 15, the Licensee shall consult with the Forest Service with regard to measures needed to ensure protection and utilization of the National Forest resources affected by the Project. Within 60 days following such consultation, the Licensee shall file with the Commission evidence of the consultation with any recommendations made by the Forest Service. The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the 4(e) conditions that require measures necessary to accomplish protection and utilization of National Forest resources.

When Forest Service section 4(e) conditions require the Licensee to file a plan with the Commission that is approved by the Forest Service, the Licensee shall provide the Forest Service a minimum of 60 days to review and approve the plan before filing the plan with the Commission. Upon Commission approval, the Licensee shall implement Forest Service required and approved plans.

Condition No. 5—Surrender of License or Transfer of Ownership (final condition)

Prior to any surrender of this license, the Licensee shall provide assurance acceptable to the Forest Service that Licensee shall restore any project area directly affecting National Forest System lands to a condition satisfactory to the Forest Service upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such National Forest System lands and shall include adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the project, the Licensee shall assure that, in a manner satisfactory to the Forest Service, the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by the Forest Service to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by the Forest Service, to estimate the potential costs associated with surrender and restoration of any project area directly affecting National Forest System lands to Forest Service specifications. In addition, the Forest Service may require the Licensee to pay for an independent audit of the transferee to assist the Forest Service in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. 6—Hazardous Substances Plan (preliminary condition)

Within 1 year of license issuance, the Licensee shall file with the Commission a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup for Project facilities on or affecting National Forest System lands. In addition, during planning and prior to any new construction or maintenance not addressed in an existing plan, the Licensee shall notify the Forest Service, and the Forest Service shall make a determination whether a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup is needed.

At a minimum, the plan must require the Licensee to (1) maintain in the Project area, a cache of spill cleanup equipment suitable to contain any spill from the Project; (2) to periodically inform the Forest Service of the location of the spill cleanup equipment on National Forest System lands and of the location, type, and quantity of oil and hazardous substances stored in the Project area; (3) provide an outline of Licensee's procedures for reporting and responding to releases of hazardous substances, including names and phone numbers of all emergency response personnel and their assigned responsibilities, and (4) inform the Forest Service immediately of the nature, time, date, location, and action taken for any spill affecting National Forest System lands and Licensee adjoining property.

Condition No. 7—Use of Explosives (preliminary condition)

1. Use of explosives shall be consistent with State and local requirements. The Licensee shall use only electronic detonators for blasting on National Forest System lands and Licensee adjoining property, except near high-voltage powerlines. The Forest Service may allow specific exceptions when in the public interest.
2. In the use of explosives, the Licensee shall exercise the utmost care not to endanger life or property and shall comply with the requirements of the Forest Service. The Licensee shall be responsible for any and all damages resulting from the use of explosives and shall adopt precautions to prevent damage to surrounding objects. The Licensee shall furnish and erect special signs to warn the public of the Licensee's blasting operations. The Licensee shall place and maintain such signs so they are clearly evident to the public during all critical periods of the blasting operations, and shall ensure that they include a warning statement to have radio transmitters turned off. The Licensee shall store all explosives on National Forest System lands in a secure manner, in compliance with State and local laws and ordinances, and shall mark all such storage places "DANGEROUS—EXPLOSIVES." Where no local laws or ordinances apply, the Licensee shall provide storage that is satisfactory to the Forest Service and in general not closer than 1,000 feet from the road or from any building or camping area.
3. When using explosives on National Forest System lands, the Licensee shall adopt precautions to prevent damage to landscape features and other surrounding objects. When directed by the Forest Service, the Licensee shall leave trees within an area designated to be cleared, as a protective screen for surrounding vegetation during blasting operations. The Licensee shall remove and dispose of trees so left when blasting is complete. When necessary, and at any point of special danger, the Licensee shall use suitable mats or some other approved method to smother blasts.

Condition No. 8—Fire Prevention, Response, and Investigation (final condition)

Within one year of license issuance the Licensee shall file with the Commission a Fire Prevention and Response Plan that is approved by the Forest Service, and developed in

consultation with appropriate State and local fire agencies. The plan shall set forth in detail the Licensee's responsibility for the prevention (excluding vegetation treatment as described in Condition No. 32) reporting, control, and extinguishing of fires in the vicinity of the project resulting from project operations.

At a minimum the plan shall address the following categories:

1. Fuels Treatment/Vegetation Management: Identification of fire hazard reduction measures to prevent the escape of project-induced fires.
2. Prevention: Availability of fire access roads, community road escape routes, helispots to allow aerial firefighting assistance in the steep canyon, water drafting sites and other fire suppression strategies. Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access.
3. Emergency Response Preparedness: Analyze fire prevention needs including equipment and personnel availability.
4. Reporting: Licensee shall report any project related fires to the Forest Service within 24 hours.
5. Fire Control/Extinguishing: Provide the Forest Service a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel. Include appropriate measures from Condition 32 and assure fire prevention measures will conform to water quality protection practices as enumerated in USDA, Forest Service, Pacific Southwest Region, Water Quality Management for National Forest System Lands in California-Best Management Practices.

Investigation of Project Related Fires

The Licensee agrees to fully cooperate with the Forest Service on all fire Investigations. The Licensee shall produce upon request all materials and witnesses not subject to the attorney-client or attorney work product privileges, over which the Licensee has control, related to the fire and its investigation including:

- All investigation reports
- All witness statements
- All photographs
- All drawings
- All analysis of cause and origin
- All other, similar materials and documents regardless of how collected or maintained

The Licensee shall preserve all physical evidence, and give custody to the Forest Service of all physical evidence requested. The Forest Service shall provide the Licensee with

reasonable access to the physical evidence and documents the Licensee requires in order to defend any and all claims, which may arise from a fire resulting from project operations, to the extent such access is not precluded by ongoing criminal or civil litigation.

Condition No. 9—Access by the United States (final condition)

The United States shall have unrestricted use of any road over which the Licensee has control within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause the Licensee to bear a share of costs disproportionate to the Licensee's use in comparison to the use of the road by others.

Condition No. 10—Road Use (final condition)

The Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Road Management Plan (refer to Condition No. 40). The Forest Service reserves the right to close any and all such routes where damages is occurring to the soil or vegetation, or, if requested by Licensee, to require reconstruction/construction by the Licensee to the extent needed to accommodate the Licensee's use. The Forest Service agrees to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition No. 11—Maintenance of Improvements (preliminary condition)

The Licensee shall maintain all its improvements and premises on National Forest System lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the Forest Service. The Licensee shall comply with all applicable Federal, State, and local laws, regulations, including but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., the Resources Conservation and Recovery Act, 42 U.S.C. 6901 et seq., the Comprehensive Environmental Response, Control, and Liability Act, 42 U.S.C. 9601 et seq., and other relevant environmental laws, as well as public health and safety laws and other laws relating to the siting, construction, operation, maintenance of any facility, improvement, or equipment.

Condition No. 12—Safety During Project Construction Plan (preliminary condition)

Sixty days prior to ground-disturbing activity related to new Project construction on or affecting National Forest System lands, the Licensee shall file with the Commission a Safety During Construction Plan approved by the Forest Service that identifies potential hazard

areas and measures necessary to protect public safety. Areas to consider include construction activities near public roads, trails and recreation areas and facilities.

The Licensee shall perform daily (or on a schedule otherwise agreed to by the Forest Service in writing) inspections of Licensee's construction operations on National Forest System lands and Licensee adjoining fee title property while construction is in progress. The Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to the Forest Service on a schedule agreed to by the Forest Service. The inspections must specifically include fire plan compliance, public safety, and environmental protection. The Licensee shall act immediately to correct any items found to need correction.

Condition No. 13—Pesticide Use Restrictions (preliminary condition)

Pesticides may not be used to control undesirable woody and herbaceous vegetation, aquatic plants, insects, and rodents, undesirable fish, or other pests on National Forest System lands without the prior written approval of the Forest Service. The Licensee shall submit a request for approval of planned uses of pesticides. The request must cover annual planned use and be updated as required by the Forest Service. The Licensee shall provide information essential for review in the form specified. Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the request was submitted. In such an instance, an emergency request and approval may be made.

The Licensee shall use on National Forest System lands only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned. The Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers.

Condition No. 14—Erosion Control Measures Plan (preliminary condition)

Sixty days prior to beginning any new construction or non-routine maintenance projects with the potential for causing erosion and/or stream sedimentation on or affecting National Forest System lands (including but not limited to planned recreation-related construction), the Licensee shall file with the Commission an Erosion Control Measures Plan that is approved by the Forest Service. The Plan shall include measures to control erosion, stream sedimentation, dust, and soil mass movement.

The plan shall be based on actual-site geologic, soil, and groundwater conditions and shall include:

1. A description of the actual site conditions;
2. Detailed descriptions, design drawings, and specific topographic locations of all control measures;
3. Measures to divert runoff away from disturbed land surfaces;
4. Measures to collect and filter runoff over disturbed land surfaces, including sediment ponds at the diversion and powerhouse sites;

5. Revegetating disturbed areas in accordance with current direction on use of native plants and locality of plant and seed sources;
6. Measures to dissipate energy and prevent erosion; and,
7. A monitoring and maintenance schedule.

Condition No. 15—Valid Claims and Existing Rights (preliminary condition)

This license is subject to all valid rights and claims of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

Condition No. 16—Compliance with Regulations (final condition)

The Licensee shall comply with the regulations of the Department of Agriculture for activities on National Forest System lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting National Forest System lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition No. 17—Protection of United States Property (preliminary condition)

The Licensee shall protect from damage the land and property of the United States covered by and used in connection with this license.

Condition No. 18—Indemnification (final condition)

The Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- the releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license.

The Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license.

Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition No. 19—Surveys, Land Corners (final condition)

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on National Forest System lands are destroyed by an act or omission of the Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the County Surveyor, or (3) the specifications of the Forest Service. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 20—Damage to Land, Property, and Interests of the United States (final condition)

The Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the project works or the works appurtenant or accessory thereto under the license. The Licensee's liability for fire and other damages to National Forest System lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

Condition No. 21—Risks and Hazards on National Forest System Lands (final condition)

As part of the occupancy and use of the project area, the Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly affecting National Forest System lands within the project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on National Forest System lands shall be performed after consultation with the Forest Service. In emergency situations, the Licensee shall notify the Forest Service of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not the Forest Service is notified or provides consultation; the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 22—Access (preliminary condition)

The Forest Service reserves the right to use or permit others to use any part of the licensed area on National Forest System lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

Condition No. 23—Signs (preliminary condition)

The Licensee shall consult with the Forest Service prior to erecting signs on National Forest System lands covered by the license. Prior to the Licensee erecting signs or advertising devices on National Forest System lands covered by the license, the Licensee must obtain the written approval of the Forest Service as to location, design, size, color, and message. The Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

III. Project Specific Forest Service Conditions

Condition No. 24—Streamflow (preliminary, except for 24(6), which is final)

1. Minimum Streamflows. For the preservation and improvement of aquatic resources in the Project area, Licensee shall maintain specified minimum streamflows and release Pulse Flows below Poe dam in accordance with the Table A-1 below. The minimum streamflows identified are minimum release requirements as per Paragraph 3 below. Minimum streamflows shall commence within 60 days of License issuance, unless facility modifications are required.

Table A-1. Minimum Streamflows

Release from Poe Dam (cfs)				
<i>Month</i>	<i>Water Year Type</i>			
	Wet	Normal	Dry	Critically Dry
October	250	250	150	150
November	275	275	150	150
December	300	300	180	150
January	325	300	180	150
February (1)	350	325	225	225
March	350	350	280	270
April	400	375	280	270
May	425	325	250	250
June (2)	350	300	220	220
July (2)	300	275	200	180
August (2)	300	250	200	180
September (2)	300	250	180	180

(1) See Paragraph 2, Pulse Flows in North Fork Feather River

(2) See Paragraph 3, Temperature Moderation

Where facility modification is required to implement the efficient release of minimum streamflows, the Licensee shall submit applications for permits within one year after license issuance and complete such modifications as soon as reasonably practicable but no later than two years after receipt of all required permits and approvals. Prior to completion of such required facility modifications, the Licensee shall make a good faith effort to provide the specified Minimum Streamflows within the capabilities of the existing facilities. Good faith is defined as honesty of purpose, free from intention to defraud, faithful to one's duty or obligation. The requirements of this Paragraph 1 are subject to temporary modification if required by equipment malfunction, as directed by law enforcement authorities, or in emergencies. An emergency is defined as an event that is reasonably out of the control of the Licensee and requires Licensee to take immediate action, either unilaterally or under instruction by law enforcement or other regulatory agency staff, to prevent imminent loss of human life or substantial property damage. An emergency may include, but is not limited to, natural events such as landslides, storms or wildfires, malfunction or failure of Project works, and recreation accidents.

The requirements of this condition are subject to temporary modification if required by an emergency, as defined above. If the Licensee temporarily modifies the requirements of these conditions, then the Licensee shall make all reasonable efforts to promptly resume performance of such requirements and shall notify California Department of Fish and Game, State Water Resources Control Board, Forest Service, U.S. Fish and Wildlife Service, and NOAA Fisheries Service.

2. Pulse Flows in North Fork Feather River. Licensee shall implement Pulse Flows in the Poe reach to further assist in the preservation and improvement of aquatic conditions in the Project area.

A. Pulse Flows: On February 10, in successive Dry and/or Critically Dry years, if a mean daily flow of 2,000 cfs or more has not occurred within the previous 18 months, Licensee shall provide a pulse flow of at least 2,000 cfs prior to March 1. The duration of the pulse flow shall be 12 hours exclusive of ramp up or down which shall occur at basic ramping rates. The total volume of water released for each pulse flow event (including the water released during the ramp up and ramp down periods and excluding base flow) shall exceed 2,560 AF (acre feet). Initially, the typical schedule will be to increase the streamflow at the Basic Ramping Rate as defined in Paragraph 4(a) below to reach the peak streamflow, and exceed the target streamflow until beginning downramping. If monitoring of the pulse flow indicates that the desired outcome of removal of accumulated organic and fine-grained sediment is not being achieved or if the expected benefits are better achieved by a pulse flow of a different magnitude or duration, Licensee shall modify the magnitude or duration of the pulse flow to ensure adequate removal of undesirable material but without requiring the release of more than 2,600 AF of water in excess of the required minimum streamflow, after consultation and approval by the Forest Service.

The pulse flow shall be scheduled prior to the temperature of the North Fork Feather River at NF-23 exceeding 10 degrees C mean daily water temperature on two successive days. Pulse flows shall also not take place if rainbow trout spawning in the Poe reach is observed and reported to Licensee by the California Department of Fish and Game or Forest Service.

B. Pulse Flow Monitoring: The Licensee shall, within 12 months of license issuance, develop and submit to the Commission, a Pulse Flow Monitoring Plan. The plan shall be prepared in consultation with the Forest Service, California Department of Fish and Game, United States Fish and Wildlife Service, NOAA Fisheries Service, and State Water Resources Control Board. The Pulse Flow Monitoring Plan shall be approved by the Forest Service and filed with the Commission before implementation. The plan shall specify how Licensee will evaluate movement of organic material and fine-grained sediment in the Poe Reach during scheduled Pulse Flow events. Emphasis shall be placed on monitoring the removal of organic material and fine-grained materials from spawning sized stream substrate as well as the effectiveness of removal of fine organic material that has accumulated in the Poe reach since the last spill or pulse flow of at least 2000 cfs. As a secondary objective, Licensee shall evaluate the effectiveness of pulse and project uncontrolled flows in removing gravel from source areas such as tributary streams or debris torrent locations. Calculation of absolute quantities is not required. If, upon review of the data collected after the first three pulse flows as specified by the Pulse Flow Monitoring Plan, the Forest Service, California Department of Fish and Game, United States Fish and Wildlife Service, NOAA Fisheries Service, and State Water Resources Control Board determine that the pulse flow requirement described in Paragraph 2 (A) above could be improved to enhance the availability and distribution of

spawning-sized gravel or enhance biological function, the agencies specified above may propose revisions to the magnitude, duration or frequency of scheduled pulse flows subject to the limitation that the revised pulse flow schedule shall not require more than 2,600 AF in excess of the minimum streamflow requirement.

3. Temperature Moderation. (10(a) recommendation)

4. Streamflow Measurement. For the purpose of determining the river stage and Minimum Streamflow below Poe Dam, Licensee shall operate and maintain the existing gage at NF-23 (United States Geological Survey (USGS) gage 11404500) consistent with all requirements of FERC and under the supervision of the USGS. Any modification of the gage facilities at NF-23 that may be necessary to measure the new Minimum Streamflow releases shall be completed within three years after issuance of the New Project License. Licensee shall record instantaneous 15-minute streamflow as required by USGS standards at NF-23. The instantaneous 15-minute streamflow at these gages shall be at least 90 percent of the Minimum Streamflows set forth in Tables A-1 above provided that the mean daily flows shall be equal to or greater than the Minimum Streamflow set forth in Table A-1.

5. Ramping Rates. For the preservation and improvement of aquatic resources in the Project area, Licensee shall control river flows by ramping streamflow releases from Poe Dam as provided in this Paragraph 5. Ramping Rates shall not apply to releases from Poe Powerhouse or uncontrollable spills from Project dams. An uncontrollable spill will occur and is defined as the water flowing over Poe Dam when inflow to the reservoir exceeds the sum of the streamflow release requirement plus current flow capacity of the generating units.

A. Basic Ramping Rates: During periods when ramping can be controlled, Ramping Rates shall apply to releases made from Poe Dam. Ramping Rates shall be followed during releases made to provide Pulse Flows and recreation river flows, and all other releases from Poe Dam that the Licensee makes for operational purposes. Monthly changes in Minimum Streamflow releases shall be made in a single step because the change is always less than the Ramping Rate criterion. Licensee shall follow the Basic Ramping Rate as close as reasonably practicable given gate and other operating limitations:

Poe Dam:

March through June-250 cfs/hr. and 150 cfs/hr. down-ramp, as measured at NF-23

Remainder of the year-400cfs/hr. up-ramp and 150 cfs/hr down-ramp, as measured at NF-23

Changes in Poe Dam streamflow releases, because of gate size and other factors, may exceed the Ramping Rate in any particular hour, but Licensee shall make a good faith effort as defined in Paragraph 1 to return to the overall Basic Ramping Rate in the next and subsequent hours.

B. Revision to Ramping Rates: In the event that studies or monitoring during the term of the License identify the need for modifications to ramping rates, the Licensee shall consult with the Forest Service, United States Fish and Wildlife Service, NOAA Fisheries Service, California Department of Fish and Game, and State Water Resources Control Board to establish more appropriate rates. New ramping rates for pulse flows shall not result in an increase in the total volume of water that is required to be released for pulse flows or recreation releases when the new ramping rates are applied. The revised ramping rates shall be submitted to and approved by the Forest Service and filed with the Commission before implementation.

C. Unit Trips: Licensee shall make a good faith effort as defined in Paragraph 1 to control streamflow releases to stay within the Basic Ramping Rates but shall not be in violation of the Basic Ramping Rates in the event that the specified rates are exceeded due to a unit tripping off-line, and subsequent restoration, or other conditions beyond the reasonable control of Licensee.

6. Tributary Access (formerly preliminary condition no. 27). Within 6 months after license issuance, the Licensee shall develop, in consultation with the Forest Service and other interested agencies, a tributary access observation program. The purpose of the observations shall be to evaluate whether trout access into Mill and Flea Valley creeks from the North Fork Feather River is blocked during the spawning and annual low flow season as a result of the implementation of the flow regime required by the new license or other project operations. The observation program shall be conducted annually for three years following license issuance. The Licensee shall consult with Forest Service and other interested agencies by January 31 to review the previous year's observations and agency comments as to whether any barriers that have developed are a result of the implementation of the new flow regime or otherwise project related, and if so, what actions are necessary for barrier removal. If after review and consultation regarding the results of the observations and evaluation, the Licensee, the Forest Service and other interested agencies determine that tributary access needs to be modified as a result the implementation of the new flow regime or otherwise as a result of project operations, Licensee shall file the recommendations with the Commission and implement the actions within one year of FERC's approval of the filing.

Condition 25-Water Year Type (preliminary condition)

Minimum streamflows, and pulse flow occurrence may vary depending on the predicted magnitude of the annual runoff from the river basin. Water years have been classified into four Water Year Types based on the California Department of Water Resources (DWR) records of annual inflow to Lake Oroville (Oroville) from 1930-1999: Wet, Normal, Dry, and Critically Dry (CD). Licensee shall determine Water Year Type based on the predicted, unimpaired inflow to Oroville and spring snowmelt runoff forecasts provided by Licensee and DWR each month from January through May. The Water Year Types are defined as follows:

Wet:	Greater than or equal to 5,679 thousand acre-feet (TAT) inflow to Oroville
Normal:	Less than 5,679 TAF, but greater than or equal to 3,228 TAF inflow to Oroville

Dry: Less than 3,228 TAF, but greater than or equal to 2,505 TAF inflow to Oroville
 CD: Less than 2,505 TAF inflow to Oroville

Licensee shall make a forecast of the Water Year Type on or about January 10, notify Forest Service, California Department of Fish and Game, U.S. Fish and Wildlife Service, State Water Resources Control Board, Plumas County, and other parties requesting the information within 15 days, and operate the Project based on that forecast for the remainder of that month and until the next forecast. New forecasts will be made on or about the tenth of February, March, April, and May after the snow surveys are completed, and operations will be changed as appropriate. In making the forecast each month, average precipitation conditions will be assumed for the remainder of the water year. The May forecast shall be used to establish the Water Year Type for the remaining months of the year and until the next January 10, when forecasting shall begin again. Licensee shall provide notice to FERC, State Water Resources Control Board, California Department of Fish and Game, Forest Service, U.S. Fish and Wildlife Service, NOAA Fisheries Service, and Plumas County of the final Water Year Type determination within 15 days of making the determination.

Condition No. 26-Multiple Dry Water Years (preliminary condition)

By March 10 of the second or subsequent Dry or Critically Dry water year and the year following the end of a sequence of Dry or Critically Dry water years, Licensee shall notify the Forest Service, California Department of Fish and Game, United States Fish and Wildlife Service, State Water Resources Control Board, NOAA Fisheries Service, and Plumas County of Licensee's drought concerns. By May 1 of these same years Licensee shall consult with representatives from the Forest Service, California Department of Fish and Game, United States Fish and Wildlife Service, NOAA Fisheries Service, and State Water Resources Control Board to discuss operational plans to manage the drought conditions. If the parties specified above agree on a revised operational plan, Licensee may begin implementing the revised operational plan as soon as it files documentation of the agreement with the Commission. If unanimous agreement is not reached, Licensee shall submit the revised proposed plan that incorporates as many Agency issues as possible to the Commission, as well as both assenting and dissenting comments, should they exist, request expedited approval, and implement the proposed plan until directed otherwise by the Commission.

Condition No. 27-Tributary Access (deleted)

Condition No. 28-Poe Reach Biological Monitoring (preliminary condition)

Within one year of license issuance, and after consultation with the Forest Service, United States Fish and Wildlife Service, NOAA Fisheries Service, State Water Resources Control Board, California Department of Fish and Game, the Licensee shall file with the Commission a fish population, benthic macroinvertebrate, and amphibian monitoring plan approved by the Forest Service. The plan shall outline sampling to be conducted in the Poe bypass reach.

The fish and benthic macroinvertebrate plan shall include, at a minimum, the following schedule and elements: a) in years 6 and 16 after license issuance, Licensee shall initiate a fish and benthic macroinvertebrate monitoring program. Sampling shall occur every two years over a six-year period beginning in years 6 and 16, for a total of six sampling efforts over the two periods, and b) monitoring of fish populations including condition and trend and benthic macroinvertebrates in at least three sites in the Poe reach. Benthic macroinvertebrate monitoring shall include population robustness, feeding group and tolerance/intolerance trend monitoring. Sampling may be deferred to the following year in the event of a Critically Dry Year.

The amphibian monitoring plan for the Poe bypass reach shall include targeted monitoring of Forest Service sensitive amphibians conducted annually beginning no later than the first spring following license issuance and continuing for five years. Beginning in year 7 sampling shall be conducted bi-annually until year 15 after license issuance. Monitoring shall include the adaptive response of foothill yellow-legged frogs (FYLF) to changes in project flow timing and magnitude, verification of suitable habitat, inventory of available habitat as compared to what habitat is actually used, population health, reproductive success, and distribution.

Licensee shall provide results of fish and benthic macroinvertebrate monitoring and any flow change recommendations to the Commission, Forest Service, United States Fish and Wildlife Service, NOAA Fisheries Service, State Water Resources Control Board, California Department of Fish and Game in a draft technical report prepared by January of the year following completion of each sampling effort. The Licensee shall finalize the technical report by the following June. In addition to describing the results, the report shall compare the results with those of previous surveys. The fish-based sampling shall discuss implications regarding trends in fish abundances. The benthic macroinvertebrate sampling report shall enumerate any changes over time regarding the composition of functional feeding groups, overall population heterogeneity and robustness, and pollution tolerance/intolerance trends.

Licensee shall provide results of amphibian monitoring to the Commission, Forest Service, United States Fish and Wildlife Service, NOAA Fisheries Service, State Water Resources Control Board, California Department of Fish and Game in a draft technical report prepared by January of the year following completion of each amphibian monitoring effort. Amphibian monitoring shall enumerate changes in habitat occupied, including extent of occupation and trends in FYLF abundance. The Licensee shall finalize the technical report by the following June. In addition to describing the results, the report shall compare the results with those of previous surveys.

At the conclusion of each aquatic monitoring cycle (License term years 10 and 20 for fish and benthic macroinvertebrates or annually or bi-annually until year 15 for amphibians as the case may be) described above, the Licensee, Forest Service, California Department of Fish and Game, United States Fish and Wildlife Service, NOAA Fisheries Service, State Water Resources Control Board shall meet to review the results of the monitoring. If, after review of the data collected during monitoring, the parties specified above in this paragraph

determine that aquatic species or other ecological attributes may benefit from modifications to the Minimum Streamflows set forth in Table A-1 of Condition 25, the parties specified above in this paragraph shall evaluate and determine whether such modifications: (1) can be implemented within Licensee's operational capabilities; (2) will maintain the total annual volume of water that has been allocated for Minimum Streamflows in any given Water Year Type as set forth in Table A-1 of Condition 25; and (3) will not adversely impact other Beneficial Uses, including hydroelectric power generation, and recreation. If all agencies listed in this paragraph concur and propose revised Minimum Streamflows that meet these criteria, the Licensee shall file the proposal with the Commission for its approval.

Condition No. 29-Recreation (preliminary condition)

Within 6 months of license issuance, Licensee shall prepare a Recreation Enhancement, Construction and Implementation Plan outlining the project specific construction details and schedule for recreation projects listed below. Prior to submitting the plan to the Commission, Licensee shall submit the details and schedule for construction of facilities located on National Forest System lands to the Forest Service for approval.

Licensee shall maintain recreation sites located on National Forest System lands in accordance with Meaningful Measures for Quality Recreation Management (February 5, 2002) or as amended standards for health, cleanliness, and resource protection.

Unless otherwise specified, all recreation improvements shall be completed within 3 years of license issuance. A listing of recreation enhancements follows:

Within 6 months of completion of recreation improvements at *Forest Entrance/Scenic Viewpoint*, Sandy Beach, Poe Beach, and *Bardees Bar*, Licensee shall apply to the Commission to adjust the FERC Project boundary as needed to incorporate these facility components.

- A. Forest Entrance/Scenic Viewpoint: (10(a) recommendation)
- B. Poe Powerhouse: (10(a) recommendation)
- C. Poe Beach: Licensee shall provide and maintain the following improvements for the duration of the license term:
 - Replace the rope-guided trail with a combination of stairs and primitive, stable, switchback trail. The stairway and primitive trail design, construction materials, placement, and construction schedule shall be approved by the Forest Service.
 - Provide signing at the bottom of the trail indicating a "Pack it in; Pack it out" policy and also inform users that there is a public restroom facility at Poe Powerhouse.

D. Poe Reservoir Access: (10(a) recommendation)

E. Sandy Beach: Licensee shall provide and maintain the following improvements for the duration of the license term:

- Licensee shall obtain the approval of Caltrans for work associated with the transition to the access road from Highway 70 including signage requirements for eastbound traffic.
- Grade and surface with crushed rock the existing access and parking area.
- Pave the transition from Highway 70 to the beginning of the parking area.
- Add regulatory signs (i.e. camping limit, campfire requirements, pick up trash, etc).
- Install two portable toilets at the parking lot during the recreation season.
- Provide a trash receptacle during the recreation season.
- Licensee shall maintain the restrooms and trash cleanup at the site to Forest Service Meaningful Measures standards for health and cleanliness.
- Construct a hardened trail or stairway to the beach area from the parking area.
- Maintain the existing gate to facilitate closure as necessary.
- Licensee shall request that the Forest Service prepare and implement a site monitoring plan for a period of 5 years following the issuance of the new Project license. The plan shall specify monitoring standards such as frequency of use counts, Limits of Acceptable Change monitoring criteria, and sanitary surveys.
- Limitations on Construction: Licensee may request an amendment to be relieved of this requirement if Caltrans imposes conditions for approval deemed to be cost ineffective by the Licensee and Forest Service
- At the conclusion of the 5 years of monitoring, Licensee and the Forest Service will evaluate the use patterns and determine whether construction of a permanent restroom facility is required. If the Licensee and Forest Service agree that a permanent restroom is necessary, then the Licensee shall construct it within one year.

F. Bardees Bar: (10(a) recommendation)

G. Bardees Bar Bridge: (10(a) recommendation)

H. *Visitor Center*: (10(a) recommendation)

Condition No. 30-River Ranger (preliminary condition)

By March 1 of each year of the new Project license, the Licensee shall provide to the Forest Service \$12,000 (escalated dollars) to assist in funding a “River Ranger” position. The purpose of this position shall be to provide additional light maintenance, visitor information/assistance, user safety, collect information on recreation facility use, conduct

user surveys, make use counts and Forest Protection Officer duties in the Project bypass reach and nearby reaches.

Licensee shall request that the Forest Service combine funding provided under the Poe project with that provided by the Licensee under the Upper North Fork Feather River Project (FERC No. 2105) to more efficiently manage recreation use of the Feather River from Canyon Dam to Big Bend Dam.

The Licensee may request that the Forest Service provide the Licensee by January 31 of each year a written summary of the previous year expenditures and River Ranger activities and the current year's planned expenditures and River Ranger activities.

Funding shall be escalated starting in January 2006 based on the U.S. Gross Domestic Product-Implicit Price Deflator (GDP-IPD).

Condition No. 31-River Flow Information (preliminary condition)

Within one year of new Project License issuance, Licensee shall make information on streamflow at North Fork Feather River NF-23 available to the public via toll-free phone and/or Internet. Within 4 hours of collection of streamflow at North Fork Feather River NF-23 post the flow on the Internet site for the current and prior 6 days for the entire year. All streamflow values shall be rounded to the nearest 100 cfs and plots or tables showing these data will be labeled "These provisional data have not been reviewed or edited and may be subject to significant change." The Licensee may, at their discretion but limited by their good faith (as defined in Condition 24, Paragraph 1) intent to routinely and continuously provide this flow information, block the posting of this information when the information is determined by the Licensee to have significant market value that could adversely affect Licensee bidding activities and power or ancillary service prices.

Condition No. 32-Fuel Treatment Plan (preliminary condition)

Within one year of License issuance, Licensee shall file with the Commission a Fuel Treatment Plan, approved by the Forest Service, for the purpose of identifying hazardous vegetative conditions surrounding project facilities that may accelerate the spread of a wildfire onto National Forest System lands as a result of Licensee activities or might place project facilities in jeopardy from an approaching fire. At a minimum the plan shall include provisions for: (1) analysis of live and dead fuel loading and potential fire behavior within 300 feet of project features; (2) treatments to be employed to reduce the hazard; (3) implementation schedule; and (4) provisions for the reassessment of hazard at 5 to 8 year intervals depending on regrowth of vegetation. Treatments extending onto adjacent National Forest System lands shall be approved by the Forest Service. When practicable coordinate implementation and accomplishment of hazard reduction activities with those of the Forest Service.

Condition No. 33-Revegetation of the Bardee's Bar Tunnel Spoil Pile (preliminary condition)

Within one year of License issuance, Licensee shall file with the Commission a Bardees Bar tunnel spoil revegetation plan, approved by the Forest Service for the purpose of identifying measures to be taken to revegetate the spoil pile. The plan shall include an implementation schedule, site preparation and planting techniques, number of planting sites, plant species to be established and follow-up measures to ensure success. The plan shall be coordinated with the removal of the Bardees Bar bridge and obliteration of bridge access roads as described in Condition No. 29. The plan shall also include an evaluation of the stability of the undercut concrete features located at the foot of the spoil pile as well as a schedule for stabilization or removal of undercut concrete from the stream channel.

Condition No. 34-Heritage Resources (preliminary condition)

Within one year of license issuance, Licensee shall file with the Commission, a Heritage Properties Management Plan (HPMP) approved by the Forest Service for the purpose of protecting and interpreting heritage resources. The Licensee shall consult with the State Historic Preservation Officer, Native American Tribes, Forest Service, and other applicable agencies and communities during the preparation of the plan. The HPMP will be incorporated into the Programmatic Agreement of which the Forest Service will be a signatory. The HPMP, as appropriate, shall accurately define the area of potential effects, including effects of implementing Section 4(e) conditions, and take into account project effects on National Register properties, Native American traditional cultural values; and Project impacts to archaeological properties on National Forest System lands. The HPMP shall also provide measures to mitigate the identified impacts, a monitoring program, and management protocols for the ongoing protection of archaeological properties.

If prior to, or during, ground-disturbing activities or as a result of project operations, items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on National Forest System lands and Licensee adjoining fee title property, the Licensee shall immediately cease work in the affected area. The Licensee shall then notify the Forest Service and shall not resume work on ground-disturbing activity until appropriate evaluation of the find has been completed and Licensee has received written approval from the Forest Service.

If deemed necessary, the Forest Service may require the Licensee to perform recovery, excavation, and preservation of the site and its artifacts at the Licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by the Forest Service.

Condition No. 35-Special Status Species (final condition)

The Licensee shall, beginning the first full calendar year after license issuance, in consultation with the Forest Service, annually review the current list of special status plant and wildlife species (species that are Federal Endangered or Threatened, Forest Service Sensitive, Stanislaus National Forest Watch Lists) that might occur on National Forest System lands in the project area directly affected by project operations. When a species is added to one or more of the lists, the Forest Service in consultation with the Licensee shall determine if the species or un-surveyed suitable habitat for the species is likely to occur on

such National Forest System lands. For such newly added species, if the Forest Service determines that the species is likely to occur on such National Forest System lands, the Licensee shall develop and implement a study plan in consultation with the Forest Service to reasonably assess the effects of the project on the species. The Licensee shall prepare a report on the study including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to the Forest Service for review and approval. The Licensee shall file the report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

Condition No. 36-Protection of Threatened, Endangered, Proposed for Listing and Sensitive Species (preliminary condition)

Before taking actions to construct new project features on National Forest System lands (including, but not limited to, proposed recreation developments) that may affect a species proposed for listing, or listed under the federal Endangered Species Act (ESA), or that may affect that species' critical habitat, or a Forest Service sensitive, or other special status species or their habitats, the Licensee shall prepare, in consultation with other appropriate agencies, a biological evaluation of the potential impact of the action on the species or its habitat and submit it to the Forest Service for approval. In consultation with the Commission, the Forest Service may require mitigation measures for the protection of the affected species. Unless agreed to by the Forest Service, where current information on population occurrence for some species is lacking (e.g. valley elderberry longhorned beetle, terrestrial mollusks, and Pacific fisher) the Licensee shall perform necessary surveys prior to ground-disturbing activities. The biological evaluation shall include:

- Develop procedures to minimize adverse effects to listed species.
- Ensure project-related activities shall meet restrictions included in site management plans for listed species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to listed species.

Condition No. 37-Invasive Weed Management Plan (final condition)

Within two years of license issuance, the Licensee shall file with the Commission an Invasive Weed Management Plan developed in consultation with the Forest Service, the appropriate County Agricultural Commissioner and California Department of Food and Agriculture. Invasive weeds will be those weeds defined in the California Food and Agriculture code, and other species identified by the Forest Service. The plan will address both aquatic and terrestrial Invasive weeds within the project boundary and adjacent to project features directly affecting National Forest System lands including, roads, and distribution and transmission lines.

- 1) The Invasive Weed Plan will include and address the following elements:
 - Inventory and mapping of new populations of Invasive weeds using a Forest Service compatible database and GIS software. The Invasive weed

GIS data layer will be updated periodically and shared with resource agencies.

- Action and/or strategies to prevent and control spread of known populations or introductions of new populations, such as vehicle/equipment wash stations.
- Development of a schedule for control of all known A, B, Q and selected other rated invasive weed species, designated by resource agencies.
- On-going annual monitoring of known populations of Invasive weeds for the life of the license in locations tied to project actions or effects, such as road maintenance, at project facilities, O&M activities, , new construction sites, etc. to evaluate the effectiveness of re-vegetation and Invasive weed control measures.
- The plan will include an adaptive management element to implement methods for prevention of aquatic Invasive weeds, as necessary. These actions may include, but may not be limited to: 1) public education and signing of public boat access, 2) preparation of an Aquatic Plant Management Plan approved by the Forest Service, and in consultation with other agencies, and 3) boat cleaning stations at boat ramps for the removal of aquatic Invasive weeds.

New infestations of A& B rated weeds shall be controlled within 12 months of detection or as soon as is practical and feasible (A, B, C, & Q ratings refer to the California Department of Food & Agriculture Action Oriented Pest Rating System). At specific sites where other objectives need to be met all classes of Invasive weeds may be required to be treated.

Monitoring will be done in conjunction with other project maintenance and resource surveys, so as not to require separate travel and personnel. Monitoring information, in database and GIS formats, will be provided to the Forest Service as part of the annual consultation on affected National Forest resources (Condition No. 4). To assist with this monitoring requirement, training in invasive plant identification will be provided to project employees and contractors by the Forest Service.

Licensee shall restore/revegetate areas where treatment has eliminated Invasive weeds in an effort to eliminate the reintroduction of Invasive weed species. Project-induced ground disturbing activities shall be monitored annually for the first 3 years after disturbance to detect and map new populations of Invasive weeds.

Condition No. 38-Bald Eagle Management Plan (preliminary condition)

Within 90 days of license issuance, the Licensee shall initiate consultation with the Forest Service and other appropriate agencies to review and update the existing Bald Eagle Management Plan for the Project area. Within two years of License issuance, Licensee shall file with the Commission a revised Bald Eagle Management Plan approved by the Forest Service for portions of the plan involving National Forest System lands.

Condition No. 39-Land Management and Visual Resource Protection (preliminary condition)

Within 60 days prior to any ground-disturbing activity on National Forest System lands, the Licensee shall file with the Commission a Visual Management Plan approved by the Forest Service. At a minimum, the plan shall address:

- Clearing, spoil piles, and Project facilities such as diversion structures, penstocks, pipes, ditches, powerhouses, other buildings, transmission lines, corridors, and access roads.
- Facility configuration, alignment, building materials, colors, landscaping, and screening.
- Proposed mitigation and implementation schedule necessary to bring Project facilities into compliance with National Forest Land and Resource Management Plan direction.
- Locating road spoil piles either in approved areas on National Forest System lands or to a location off FS administered lands.
- Removal of all visible non-native materials, including construction debris from the surfaces of piles located on National Forest System lands.
- Stabilization and revegetation of all native material that is allowed to be left on National Forest System lands including compliance with visual quality objectives.

Condition No. 40—Road Management Plan (preliminary condition)

Within one year after license issuance, Licensee shall file with the Commission, a Road Management Plan approved by the Forest Service. The plan shall include all Forest Service and unclassified roads required by the Licensee to access the Project area.

The Project Road Management Plan shall include:

- 1) Identification of all Forest Service roads and unclassified roads on National Forest System lands needed for Project access, including road numbers.
- 2) A map of all Forest Service roads and unclassified roads on National Forest System lands used for Project access, including digital spatial data accurate to within 40 feet, identifying each road by Forest Service road number.
- 3) A description of each Forest Service road segment and unclassified roads on National Forest System lands needed for Project access including:
 - a) Termini
 - b) Length
 - c) Purpose and use
 - d) Party responsible for maintenance
 - e) Level of maintenance
 - f) Structures accessed
 - g) Location and status of gates and barricades, if any
 - h) Ownership of road segment and underlying property
 - i) Instrument of authorization for road use
 - j) Assessment of road conditions

- 4) Provisions for the Licensee to consult with the Forest Service in advance of performing any road construction, realignment, or closure involving Forest Service roads or lands.
- 5) The Licensee shall prepare a condition survey and a proposed maintenance plan subject to Forest Service approval annually beginning the first full-year after the Road Management Plan has been approved.

The Licensee shall obtain appropriate authorization (e.g. special use permit, road use permit, or maintenance agreement) in accordance with the Road Management Plan for all Project access roads that are under Forest Service jurisdiction outside the Project Boundary, including unclassified roads and Forest Service System roads needed for Project access. The term of the authorization shall be the same as the term of the license. The Licensee shall enter into the appropriate authorization mechanism with the Forest Service that will supersede the existing Special Use Permit. The Road Management Plan shall identify the Licensee's responsibility for road maintenance and repair costs commensurate with the Licensee's use and Project-induced use. The Road Management Plan shall specify road maintenance and management standards that provide for traffic safety; minimize erosion and damage to natural resources and that are acceptable to the Forest Service.

Licensee shall be responsible for any new construction, realignment, closure, or other road management actions proposed by Licensee in the future, subject to Forest Service standards in effect at the time, including related studies, analyses or reviews required by Forest Service.

As an alternative to preparing a Road Management Plan, Licensee may request that the Forest Service incorporate project roads located on National Forest System lands into the existing Forest Service and Licensee Road Use Agreement dated May 22, 1997. If the request is accepted by the Forest Service, Licensee shall file the Road Use Agreement with the Commission in lieu of the Road Management Plan.

APPENDIX B

SUMMARY OF WUA VALUES (JUNE-SEPTEMBER)

FOR ALTERNATIVE MINIMUM FLOW REGIMES

BY SELECTED SPECIES AND LIFE STAGES

AND WATER YEAR TYPE

POE PROJECT IFIM STUDY

1. Wet water year

Month	Entity	Flow (CFS)	Total Wetted Area		Rainbow trout (juvenile)		Rainbow trout (adult)		Sac sucker (juvenile)		Sac sucker (adult)		HH/Sac PKM^ (juvenile)		Sac PKM^ (adult)		HH^ (adult)		SMB^ (adult)			
			WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max
Jun	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	250	116081	78	8143	84	10735	81	2797	68	7951	80	21226	83	29785	100	7776	97	24518	100		
	Forest Service 4(e)	350	122420	82	8665	89	12366	94	2736	67	8403	84	23442	92	29024	97	7337	92	23797	97		
	Agency (October 2005)	500	129349	87	9031	93	13155	100	2902	71	9105	91	25192	98	26917	90	6594	82	22058	90		
Jul	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	225	114399	77	7947	82	10151	77	2919	71	7832	78	20526	80	29798	100	7853	98	24555	100		
	Forest Service 4(e)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22443	88	29520	99	7573	95	24239	99		
	Agency (October 2005)	425	126040	85	8880	91	12920	98	2841	69	8761	88	24508	96	28048	94	6841	85	22938	93		
Aug	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	225	114399	77	7947	82	10151	77	2919	71	7832	78	20526	80	29798	100	7853	98	24555	100		
	Forest Service 4(e)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22443	88	29520	99	7573	95	24239	99		
	Agency (October 2005)	350	122420	82	8665	89	12366	94	2736	67	8403	84	23442	92	29024	97	7337	92	23797	97		
Sep	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	225	114399	77	7947	82	10151	77	2919	71	7832	78	20526	80	29798	100	7853	98	24555	100		
	Forest Service 4(e)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22443	88	29520	99	7573	95	24239	99		
	Agency (October 2005)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22443	88	29520	99	7573	95	24239	99		
Maximum WUA			148855	100	9733	100	13212	100	4108	100	9990	100	25596	100	29798	100	8008	100	24555	100		

* For 110 cfs, WUA was interpreted from adjacent known values (100 and 120 cfs).

^ HH - hardhead, PKM - pikeminnow, SMB - smallmouth bass

2. Normal water year

Month	Entity	Flow (CFS)	Total Wetted		Rainbow trout (juvenile)		Rainbow trout (adult)		Sac sucker (juvenile)		Sac sucker (adult)		HH/Sac PKM [^] (juvenile)		Sac PKM [^] (adult)		HH [^] (adult)		SMB [^] (adult)			
			Area	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max
Jun	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	225	114399	77	7947	82	10151	77	2919	71	7832	78	20526	80	29798	100	7853	98	24555	100		
	Forest Service 4(e)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22442	88	29520	99	7573	95	24239	99		
	Agency (October 2005)	400	124987	84	8820	91	12803	97	2816	69	8651	87	24225	95	28417	95	7086	88	23265	95		
Jul	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	200	112470	76	7694	79	9478	72	3055	74	7690	77	19752	77	29699	100	7910	99	24514	100		
	Forest Service 4(e)	275	117409	79	8314	85	11247	85	2710	66	8052	81	21864	85	29676	100	7681	96	24399	99		
	Agency (October 2005)	400	124987	84	8820	91	12803	97	2816	69	8651	87	24225	95	28417	95	7086	88	23265	95		
Aug	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	200	112470	76	7694	79	9478	72	3055	74	7690	77	19752	77	29699	100	7910	99	24514	100		
	Forest Service 4(e)	250	116081	78	8143	84	10735	81	2797	68	7951	80	21226	83	29785	100	7776	97	24518	100		
	Agency (October 2005)	400	124987	84	8820	91	12803	97	2816	69	8651	87	24225	95	28417	95	7086	88	23265	95		
Sep	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85		
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91		
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98		
	Staff	200	112470	76	7694	79	9478	72	3055	74	7690	77	19752	77	29699	100	7910	99	24514	100		
	Forest Service 4(e)	250	116081	78	8143	84	10735	81	2797	68	7951	80	21226	83	29785	100	7776	97	24518	100		
	Agency (October 2005)	350	122420	82	8665	89	12366	94	2736	67	8403	84	23442	92	29024	97	7336	92	23796	97		
Maximum WUA			148855	100	9733	100	13212	100	4108	100	9990	100	25596	100	29798	100	8008	100	24555	100		

* For 110 cfs, WUA was interpreted from adjacent known values (100 and 120 cfs)

[^] HH - hardhead, PKM - pikeminnow, SMB - smallmouth bass

3. Dry water year

Month	Entity	Flow (CFS)	Total Wetted Area		Rainbow trout			Sac sucker		HH/Sac PKM^		Sac PKM^		HH^		SMB^				
			WUA	% of max	Rainbow trout (juvenile)		Sac sucker (juvenile)		HH/Sac PKM^ (juvenile)		Sac PKM^ (adult)		HH^ (adult)		SMB^ (adult)					
					WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max		
Jun	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Forest Service 4(e)	220***	114399	77	7947	82	10151	77	2919	71	7832	78	20526	80	29798	100	7853	98	24555	100
	Agency (October 2005)	350	122420	82	8665	89	12366	94	2736	67	8403	84	23442	92	29024	97	7336.8	92	23796	97
Jul	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Forest Service 4(e)	200	112470	76	7694	79	9478	72	3055	74	7690	77	19752	77	29699	100	7910	99	24514	100
	Agency (October 2005)	350	122420	82	8665	89	12366	94	2736	67	8403	84	23442	92	29024	97	7336.8	92	23796	97
Aug	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Forest Service 4(e)	200	112470	76	7694	79	9478	72	3055	74	7690	77	19752	77	29699	100	7910	99	24514	100
	Agency (October 2005)	260 [#]	116081	78	8143	84	10735	81	2797	68	7951	80	21226	83	29785	100	7776	97	24518	100
Sep	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110*	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	165**	110209	74	7210	74	8372	63	3238	79	7403	74	18513	72	29320	98	7967	99	24268	99
	Forest Service 4(e)	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Agency (October 2005)	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
Maximum WUA			148855	100	9733	100	13212	100	4108	100	9990	100	25596	100	29798	100	8008	100	24555	100

* For 110 cfs, WUA was interpreted from adjacent known values (100 and 120 cfs)

** For 165 cfs, WUA was interpolated from known adjacent values (160 and 180 cfs)

*** For 220 cfs, the next higher flow (225 cfs) was used to calculate WUA

[#] For 260 cfs, the next closest flow evaluated in the model (250 cfs) was used to estimate WUA

^ HH - hardhead, PKM - pikeminnow, SMB - smallmouth bass

4. Critically dry water year

Month	Entity	Flow (CFS)	Total Wetted Area		Rainbow trout (juvenile)		Rainbow trout (adult)		Sac sucker (juvenile)		Sac sucker (adult)		HH/Sac PKM^ (juvenile)		Sac PKM^ (adult)		HH^ (adult)		SMB^ (adult)	
			WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max	WUA	% of max
Jun	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Forest Service 4(e)	220***	114399	77	7947	82	10151	77	2919	71	7832	78	20526	80	29798	100	7853	98	24555	100
	Agency (October 2005)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22443	88	29520	99	7573	95	24239	99
Jul	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	165	110209	74	7210	74	8372	63	3238	79	7403	74	18513	72	29319.5	98	7967	99	24267.75	99
	Forest Service 4(e)	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Agency (October 2005)	300	119356	80	8464	87	11683	88	2682	65	8157	82	22443	88	29520	99	7573	95	24239	99
Aug	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	165**	110209	74	7210	74	8372	63	3238	79	7403	74	18513	72	29319.5	98	7967	99	24267.75	99
	Forest Service 4(e)	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Agency (October 2005)	260^	116081	78	8143	84	10735	81	2797	68	7951	80	21226	83	29785	100	7776	97	24518	100
Sep	Baseline	50	96304	65	4409	45	3814	29	4020	98	5419	54	13149	51	24595	83	7886	98	20843	85
	Current (with leakage)	110	102579	69	5682	58	5836	44	3664	89	6328	63	15542	61	26824	90	7936	99	22465	91
	PG&E	150	108853	73	6955	71	7857	59	3309	81	7238	72	17936	70	29053	98	7986	100	24086	98
	Staff	165*	110209	74	7210	74	8372	63	3238	79	7403	74	18513	72	29320	98	7967	99	24268	99
	Forest Service 4(e)	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
	Agency (October 2005)	180	111254	75	7441	76	8871	67	3159	77	7548	76	19067	74	29522	99	7944	99	24402	99
Maximum WUA			148855	100	9733	100	13212	100	4108	100	9990	100	25596	100	29798	100	8008	100	24555	100

* For 110 cfs, WUA was interpreted from adjacent known values (100 and 120 cfs)

** For 165 cfs, WUA was interpolated from adjacent values

^ for 260 cfs, the next closest flow evaluated in the model (250 cfs) was used to estimate WUA

*** For 220 cfs, the next higher flow (225 cfs) was used to calculate WUA

APPENDIX C

**COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT
Project No. 2107-016-CA**

APPENDIX C

COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT Project No. 2107-016-CA

The Federal Energy Regulatory Commission (Commission or FERC) issued its draft environmental assessment (draft EA) for the relicensing of the Poe Hydroelectric Project on August 2, 2006. The Commission requested comments be filed by September 18, 2006. In this appendix, we summarize the comments received; provide responses to those comments; and indicate, where appropriate, how we have modified the text of the final EA. We grouped the comment summaries and responses by topic for convenience. The following entities filed comments on the draft EA:

Entity	Date of Filing
Plumas County and Plumas County Flood Control and Water Conservation District	September 13, 2006
Michael F. Taylor	September 14, 2006
Pacific Gas and Electric Company	September 15, 2006
U.S. Fish and Wildlife Service	September 15, 2006
National Park Service	September 15, 2006
California State Water Resources Control Board	September 15, 2006
California Department of Fish and Game	September 15, 2006
California Sportfishing Protection Alliance	September 15, 2006
California Department of Water Resources	September 18, 2006
Chico Paddleheads and several individuals	September 18, 2006
Butte County and American Whitewater	September 18, 2006, and September 20, 2006
U.S. Department of Agriculture, Forest Service	September 29, 2006

We address all issues raised by commenters, as appropriate, in the final EA. Comments regarding purely editorial issues are addressed in the final EA and are not summarized below.

GENERAL

Comment 1: Plumas County states that the significant effects of the Poe relicensing require the preparation of an environmental impact statement (EIS). Plumas National Forest states that the context of the Poe relicensing supports the finding of a significant federal action. Plumas County states that the EIS should include a review of the Upper Feather River Integrated Regional Water Management Plan. Plumas National Forest also

states that the EIS should include additional information on streamflow conditions and alternative instream flows. Butte County and American Whitewater Affiliation (American Whitewater) also request the preparation of an EIS along with a technical conference to help resolve different minimum flow alternatives.

Response: We do not see the need for an EIS for this project. Our environmental assessment (EA) is a comprehensive National Environmental Policy Act (NEPA) document that has thoroughly analyzed the potential effects of this proposed project, as well as alternatives to the proposed project. It concludes that issuance of the license as recommended by staff would not constitute a major federal action significantly affecting the quality of the human environment. Our final EA incorporates and analyzes new information that has come to light since preparation of the draft EA, including the new instream flow regime now recommended by the resource agencies. We also see no need for a technical conference on instream flows at this time, because information available in the record has allowed us to analyze the alternative instream flow regimes.

Comment 2: Butte County and American Whitewater state that the draft EA did not properly disclose methods, evidence, and factual findings. They state deficiencies in citations within the whole document, repeated citations of the license application, and incomplete information through the document.

Response: We respectfully disagree. Our analysis in the draft EA is based on the existing public record for the project, of which the license application is a major part. A total of 57 documents were cited in the draft EA. After revisions in response to comments on the draft EA, the final EA cites 74 documents.

Comment 3: Butte County and American Whitewater state that the draft EA did not disclose the standards used for the balancing decision.

Response: Section VII of the EA describes our recommended alternative for the project, and our rationale for those recommendations. Our standards for the balancing decision depend on the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values.

PURPOSE AND NEED

Comment 4: Pacific Gas and Electric Company (PG&E) states that it is appreciative of being recognized in the draft EA for reducing greenhouse gas emissions and continuing to conserve non-renewable energy resources. It would like this recognition to be incorporated in any instream flow alternative recommendations.

Response: Our analysis of the instream flow alternatives considers the effects of those alternatives on project power production and economics.

Comment 5: Butte County and American Whitewater state that the draft EA fails to adequately document how the project is consistent with other comprehensive plans, such as the Plumas Forest Plan, the report of California Advisory Committee on Salmon and Steelhead Trout, California Outdoor Recreation Plan (1993 and 2002), and Water Quality Control Plans.

Response: Our review of these plans did not reveal any inconsistencies with the overall objectives of these plans, compared to the project as recommended by staff. However, because of the substantial amount of new information that has come to light since preparation of the draft EA, and our analysis of that new information in the final EA, we have again reviewed the consistency of the recommended project with the listed comprehensive plans.

PROPOSED ACTION AND ALTERNATIVES

Comment 6: The California Department of Water Resources (CDWR) states that it supports including Big Bend dam and reservoir within the project boundary limits of both the Poe Project No. 2107 and the Oroville Facilities Project No. 2100, but that the Commission should clarify the reporting and compliance obligations for PG&E and CDWR. CDWR believes that license compliance obligations should be assigned to PG&E. CDWR also states that no additional land conveyances of property interests are necessary for the inclusion of Big Bend dam into the project boundary of the Poe Project.

Response: If the Commission includes Big Bend dam in the Poe Project boundary, it cannot also be included within the project boundary for Project No. 2100. The reporting and compliance obligations will be the responsibility of the licensee with Big Bend dam in its project boundary. Our analysis of this issue is contained in section V.C.6 and our recommendation in section 7.A.3. We find that Big Bend dam serves Poe Project purposes and recommend it become a licensed feature of the Poe Project.

Comment 7: Plumas County requests that the final EA should include more information regarding the effects of including Big Bend dam within the Poe Project boundary.

Response: We have expanded our analysis concerning this aspect of Big Bend dam (see section V.C.6). See also our response to Comment 6.

Comment 8: Plumas County states that several environmental measures are common to the three NFFR FERC-licensed projects and should be addressed in an integrated fashion and not limited to the project boundary limits of individual projects. These environmental measures include provisions for a river ranger, rainbow trout access to project tributaries, non-motorized boating, and a visitor's center.

Response: We do not consider provisions for a river ranger to be an environmental measure. We have expanded our discussion of fish passage, including fish passage into tributaries in our cumulative effects analysis and in our discussion of Mill and Flea Valley creeks. We are now recommending monitoring of fish passage in these tributaries. We analyze non-motorized boating at the project and elsewhere in the basin and the visitor center within the context of the NFFR canyon.

Comment 9: Butte County and American Whitewater state that they believe the measures recommended by staff failed to mitigate the significant ongoing effects of the project. In addition, they believe the draft EA did not recommend measures that would mitigate the cumulative effects of the Poe Project on the entire NFFR basin.

Response: We assessed all the effects of the continued operation of the Poe Project, including cumulative effects, and recommended those measures that would adequately address project effects and would strike a balance with other project benefits, including power production. As a result of our re-assessment of effects in the final EA, we have recommended some additional measures.

Comment 10: Butte County and American Whitewater question why the off-site or out-of-kind forms of mitigation were not recommended in the draft EA.

Response: As described above, we are recommending measures that would address project effects on environmental resources. We determined that these measures, in conjunction with those specified or recommended by the agencies, constituted adequate and more appropriate mitigation than off-site or out-of-kind mitigation.

Comment 11: Butte County and American Whitewater state that they believe that there was not a reasonable range of alternatives considered in the draft EA.

Response: We respectfully disagree. We conducted public scoping for the draft EA, including holding public scoping meetings in the project area, and issuing scoping documents 1 and 2, which outlined the alternatives that would be analyzed in the draft EA. The draft EA was prepared consistent with the scoping process. In addition, we considered additional alternatives in the final EA in response to agency comments. For example, Interior and Cal Fish and Game recommended a revised minimum flow regime, which we analyze in detail.

Comment 12: Butte County and American Whitewater state that the draft EA does not include enough information regarding the possible economic benefits of the action alternatives on the county.

Response: In Scoping Document 2 (SD2), we concluded that the socioeconomic issues associated with the proposed action are not substantive and that socioeconomics would

not be studied in detail the Poe EA. However, we have added language to our Comprehensive Development section to show the yearly property and local taxes that Pacific Gas and Electric pays that benefit Butte County.

WATER RESOURCES

Comment 13: The U.S. Fish and Wildlife Service (FWS), Cal Fish and Game, and the California State Water Resources Control Board (the Water Board) provide a revised minimum instream flow schedule and justification to replace the schedule in FWS' 10(j) condition no. 1a, Minimum Instream Flow Schedule, filed March 23, 2005. The revised minimum instream flow schedule is based on new information and was developed collaboratively by and is supported by FWS, Cal Fish and Game, NPS, the Water Board, the Forest Service, the California Sportfishing Protection Alliance (Sportfishing Alliance), and Butte County in their respective comments on the draft EA. The agencies have conducted more recent modeling of the Poe reach stream temperatures using the SSTEMP model, which forms part of the basis for the new flow recommendation. FWS and some of the other agency filings provide supporting information for the new recommendation.

Response: Analyses of the revised flow regime and its effect on water temperature and aquatic habitat in the project reach is included in the final EA in sections V.C.1, *Water Resources*, and V.C.2, *Aquatic Resources*, and our final recommendations are provided in section VII, *Comprehensive Development and Recommended Alternative*.

Comment 14: The National Park Service (NPS) states that it has three main concerns regarding the indicators of hydrologic alteration analysis referred to in the draft EA. The first concern is that the applicant claims that there were no gage records available for the years prior to 1958, yet the United States Geological Survey (USGS) lists gage information from 1911 at the Pulga gage and from 1906 to 1911 for the Big Bend gage. NPS also questioned why the applicant did not access pre-project data from the USGS website and instead synthesized its own data, and that the synthesized data was different from the USGS information.

Response: We did not interpret PG&E's statement on page 2 of appendix B-2 of its application to mean that gage records are not available prior to 1958. In the same paragraph, PG&E states that its study of the indicators of hydrologic alteration was needed because water resources developments (including many reservoirs, powerhouses, and other changes) in the watershed since 1911 had changed the flow regime *before* construction of the Poe Project in 1958. PG&E's analysis accounted for these changes by using the mass balance technique to model daily changes in reservoir storage and releases, powerhouse flow, and reach flow, inflow from other sources, and other sources and sinks to produce a daily streamflow record of unimpaired conditions. As stated on pages 26 and 27 of the draft EA, Lake Almanor, with a current usable capacity of

1,134,000 acre-feet, was first constructed in 1913. Other large reservoirs include Butt Valley reservoir, with 49,000 acre-feet of storage, which was constructed in 1924, and Bucks Lake with 101,400 acre-feet of storage, which was constructed in 1927. PG&E implied and staff agrees that the construction of those reservoirs, as well as smaller reservoirs and forebays associated with eight upstream hydroelectric plants, have substantially changed the low flow regime of the NFFR. During the preparation of the draft EA, we reviewed the gage data from the Big Bend gage, but due to the very short period of record and the known wet and dry cycles that are common in the Sierras due to El Nino, La Nina, and the Pacific Decadal Oscillation, reliance on that data for more than a general reference point is not justified.

Comment 15: The Sportfishing Alliance believes that the draft EA conclusion that lower base flows would be more beneficial for foothill yellow-legged frog (FYLF) is based on unsupported speculation.

Response: Initially, Garcia and Associates (GANDA) concluded that optimal FYLF breeding and tadpole rearing habitat in the Poe reach decreased as instream flows increased above 150 cubic feet per second (cfs), and that 150 cfs provided the greatest amount of suitable habitat, based on 2002 and 2004 data (GANDA, 2004c). We concur with the Forest Service and NPS comments on the draft EA that the results of the 2005 and 2006 FYLF monitoring indicate GANDA's initial conclusions regarding the relationship of FYLF habitat and flow were not correct (GANDA, 2004c), and that higher flows do not limit available habitat at current FYLF population levels. Additional information on the flow regime favored by the FYLF is included in section V.C.3, *Terrestrial Resources*. See also our responses to Comments 38-41.

Comment 16: The Sportfishing Alliance also states that the assumption in the draft EA that summer temperature goals for the reach are not achievable is based on unsupported speculation.

Response: Both the draft and final EAs discuss in detail in section V.C.1, *Water Resources*, the additional small reductions in water temperature that would occur with substantially higher flows through the bypassed reach. We also point out that, on many occasions, the temperature goals are exceeded before the water even reaches the Poe Project. These higher flows may also negatively affect other aquatic resources and would greatly decrease the energy generation from this hydroelectric project.

Comment 17: In its comments on the draft EA, PG&E proposed to prepare a Poe bypassed reach water temperature monitoring plan within 6 months following the issuance of the new license. PG&E suggests that a verified creditable model, backed with multiple years of data validation, can be more a systematic and proactive tool than reactive water temperature models, and asks the Commission to consider this approach as an alternative to continual water quality monitoring.

Response: One of staff's recommended measures is a water temperature monitoring plan. Included in that plan is the provision for possible modification of the plan after the first 3 years of monitoring, depending on monitoring results. With agency consultation and after the additional data collection from the first 3 years, a change to a verifiable and creditable model-based program with less field monitoring than the first 3 years could be a revision to the water temperature monitoring plan.

Comment 18: PG&E states that it recognizes the need to carefully control ramping rates within the facilities' capabilities. PG&E notes that it did not anticipate using powerhouse flows to implement the proposed ramping rates. PG&E further stated that they are working to address operational and equipment issues at the upstream Rock Creek-Cresta project which result in rapid flow fluctuations entering the Poe reservoir.

Response: We have revised our analysis and discussion ramping at the Poe project (sections V.C.1, *Water Resources*, and V.C.2, *Aquatic Resources*), and have included a discussion of the effects of flow fluctuations from Rock Creek-Cresta on ramping control at Poe. Based on the complicated nature of ramping at Poe, we are now recommending the development of a ramping rate plan.

Comment 19: The Water Board supports the 10(j) recommendation made by Cal Fish and Game regarding the need for ramping rates and ramping schedule. The Water Board supports the Cal Fish and Game ramping proposal in part due to the interest in the FYLF population. The Water Board requests that staff accept the ramping rate proposal.

Response: We recognize the Water Board support of the 10(j) recommendation by Cal Fish and Game for ramping rates and schedule and have further assessed ramping in sections V.C.1, *Water Resources*, V.C.2, *Aquatic Resources*, and V.C.3, *Terrestrial Resources*. We are now recommending the development of a ramping rate plan, including a schedule that is slightly more protective than Cal Fish and Game's recommendation, to fully protect all life stages of FYLF, as well as interim ramping rates.

Comment 20: Plumas County requests that the NEPA analysis include a watershed-scale, cumulative effects analysis of water temperatures at the Poe Project. The Sportfishing Alliance also asks for the development of an integrated plan for the entire NFFR watershed to address temperature issues.

Response: A cumulative effects analysis of water temperature in the NFFR was included in section V.C.1, *Water Resources*, of the draft EA. A more detailed analysis of the watershed's water temperature regime was conducted as part of the recent EIS for the Upper North Fork Feather River Project (FERC No. 2105).

Comment 21: Plumas County states that the description of the existing flow conditions in the Poe bypassed reach is inaccurate, in that it underestimates the flows that are actually provided, and overstates the benefits of the proposed flow regimes. It also comments that the draft EA does not adequately incorporate water temperature data.

Response: We pointed out in the draft EA that the actual summer and fall minimum instream flows in the Poe reach have averaged approximately 110 cfs during the last 10 years (range 90 to 147 cfs) due to poorly functioning radial gate seals at Poe dam. However, the licensed minimum flow (50 cfs) is the baseline condition for our analysis. PG&E could repair the gate seals at any time as part of its normal maintenance; if that occurred, the minimum flow could revert back to 50 cfs. The draft EA included a comprehensive analysis of water temperatures in the Poe bypassed reach, but the final EA includes a revised analysis of flow conditions and water temperatures in section V.C.1, *Water Resources*, based on the new information provided in the comments on the draft EA.

Comment 22: The Water Board states that the draft EA excluded information regarding water quality contaminants such as PCBs, mercury, and silver, and should address potential effects of ongoing project operations on bioaccumulation in the aquatic ecosystem. The Water Board requests that the final EA address the water temperature impairments and provide reasonable measures to minimize the condition in the Poe reach. The Water Board does support the monitoring plan for water temperatures and would like the measure to remain in place for the duration of the license term.

Response: Information on the sampling results for water quality contaminants such as PCBs, silver, and mercury, has now been added to the final EA in section V.C.1, *Water Resources*. The sampling results for these substances were below applicable regulatory criteria. Bioaccumulation studies were conducted by PG&E for the relicensing of its Upper North Fork Feather River Project (No. 2105) upstream of the project at the Belden forebay and bypassed reach. All the analyses for bioaccumulated PCBs in fish tissue and crayfish had concentrations below the Water Board screening value for California lakes (20 ug/kg) and the U.S. Food and Drug Administration tolerance level used to prohibit interstate commerce of fish flesh (2,000 ug/kg). Similar analyses for bioaccumulation of mercury in fish tissue and crayfish, produced results below the Food and Drug Administration action level, California Office of Environmental Health Hazard Assessment screening value, the Water Board maximum tissue residue level, and the FWS level to protect bald eagles. Regarding the waater temperature monitoring, see response to comment 17.

Comment 23: Butte County and American Whitewater state that the staff recommendations for water temperature measures do not comply with state water quality standards and the Clean Water Act.

Response: Project compliance with the Clean Water Act will be determined through the 401 Water Quality Certification process. However, the measures recommended by staff are intended to protect and enhance water quality, including water temperature, compared to existing conditions. Although our analysis in section V.C.1 focuses largely on the temperature “target” of 20C, the applicable state water quality objective for this reach is narrative and sets a limit of of a 5C increase above the temperature of the natural receiving water. As discussed in our analysis in section V.C.1, it is not unusual for the temperature of water entering the project to exceed 20C during the summer months. Conversely, as shown in Figure 5, the average monthly difference in water temperature (during the summer months; 1999, 2000, 2003) between water entering Poe reservoir and water in the lower end of the bypass reach ranged from 0.3 to 2.9C.

AQUATIC RESOURCES

Comment 24: The revised minimum instream flow schedule recommended by Interior, Cal Fish and Game, and supported by Butte County, Plumas County, and the Sportfishing Alliance requires the release of more water than specified in the initial agency recommendations and terms and conditions submitted in response to the REA notice. Interior states that the proposed increased minimum flows would result in additional fish habitat for rainbow trout by increasing the available weighted useable area (WUA).

Response: We have analyzed the revised minimum instream flow schedule (October 2005) now recommended by Interior and Cal Fish and Game, and conclude that the new flow regime would provide minor incremental increases in fish habitat and small decreases in water temperature as compared to the minimum flows we recommended in the draft EA (see sections V.C.1 and V.C.2). We conclude that the minor incremental benefits of the agency flow regime are not worth the substantially higher cost of the regime, compared to the staff-recommended flow regime.

Comment 25: Cal Fish and Game indicates that the monitoring frequency for fisheries as recommended by staff is not sufficient. Instead, Cal Fish and Game proposes that fish populations be monitored for 2 consecutive years every 5 years for the license term.

Response: Our recommendation for monitoring frequency in the draft EA was based on the monitoring frequencies for the upstream projects on the NFFR. However, we have considered Cal Fish and Game’s proposal for increased monitoring frequency, and conclude in the final EA that additional monitoring as recommended by Cal Fish and Game is warranted. We have recommended a monitoring frequency that would begin in years 4 and 5 after license issuance. Two-year monitoring cycles would continue every 5 years for the term of the license, and would be accompanied by comprehensive 6-year reports, supplemented by annual reports.

Comment 26: Cal Fish and Game requests that further consideration be given to agency requests pertaining to tributary access for rainbow trout. Cal Fish and Game reiterates the importance of Flea Valley Creek and Mill Creek for spawning, rearing, and as coldwater refugia for rainbow trout. Cal Fish and Game indicates that project operations may affect outmigration success in the summer and fall through alteration of physical habitat (e.g., water level, reduced flows, and ramping), and that these conditions should be monitored over the course of any new license to assess the effects of new license conditions on connectivity with tributary habitat. Plumas County also supports additional monitoring of rainbow trout access to Mill Creek and Flea Valley Creek to assess the effects of any new license conditions.

Response: Backpack electrofishing studies conducted by the applicant during pre-application studies indicate that Flea Valley Creek and Mill Creek are dominated by young-of-year and juvenile (1+) rainbow trout, indicating that these tributaries provide important spawning and rearing habitat. Even though project operation does not affect flow in these tributaries, because flows in Flea Valley Creek and Mill Creek can fall to as low as 0.5 and 3.0 cfs, respectively, the potential exists for hydrologic connectivity to the mainstem to be lost during summer months (e.g., changes in water level and gravel distribution). The applicant's tributary access and barrier pre-application studies indicate that low flow conditions in the NFFR and its tributaries during September and October can result in a surface water disconnect. Thus, we have further considered Cal Fish and Game's request in the final EA, and conclude that an evaluation of tributary access for outmigrating juvenile rainbow trout and as thermal refugia for adult trout is now warranted. Our recommendation in the final EA has been modified accordingly.

Comment 27: NPS states that there are problems using drift as a potential indicator of the effects of recreational flows on macroinvertebrates. NPS lists three main areas of concern on this issue: macroinvertebrates drift constantly with or without changes in flow, difficulty in determining loss of macroinvertebrate life, and difficulty in determining change and degree of change in invertebrate communities.

Response: Our initial analysis in the draft EA recognized that studies associated with drifting macroinvertebrates often only provide an indirect measure of the potential effects of recreational releases on macroinvertebrate communities (draft EA, page 78, lines 1 - 4). As noted in the draft EA, subsequent studies conducted by the licensee at the Rock Creek – Cresta Project shifted away from the use of drifting organisms to focus on benthic organisms. The final EA has been adjusted to emphasize that information obtained from the drift studies is indirect at best. However, the results of the sampling of benthic organisms also showed community-level changes as a result of recreational flow releases. As a result, we continue to have concerns about the effects of these flow releases on aquatic macroinvertebrates.

Comment 28: NPS disagrees with the term “catastrophic” when referring to drifting macroinvertebrates, and refers to Dr. Hauer’s evaluation of Rock Creek – Cresta Project studies (letter from Richard Ross-Collins, Special Deputy District Attorney, Butte County, September 19, 2006, Amended Comments of Butte County and American Whitewater on Draft Environmental Assessment). Dr. Hauer’s report indicates the use of the term is not applicable to the Rock Creek – Cresta study results, and that it should be reserved for cases in which the discharge is sufficient to mobilize bed load substrates.

Response: We agree that “catastrophic” was not the best word to describe the observed results in that it is open to varying interpretations. The final EA has been revised accordingly and the word “catastrophic” has been removed.

Comment 29: The Sportfishing Alliance states that fish passage between the Poe powerhouse and Lake Oroville has not received enough attention in the draft EA.

Response: We respectfully disagree. The draft EA described the operational importance of Big Bend dam for the regulation of tailwater elevation at the Poe Project, and evaluated the need for fish passage at the site. The final EA includes further evaluation of the potential negative effects of providing passage or removing the Big Bend dam (e.g., introduction of non-native fish).

Comment 30: PG&E states that it is currently evaluating data regarding benthic macroinvertebrate study results. It believes additional data analysis will potentially allow for a long-term trend analysis to be conducted.

Response: Staff will use any new data or information provided by the applicant, if it is available prior to publication of the final EA. To date, this information has not been filed.

Comment 31: PG&E indicates that staff has underestimated costs associated with monitoring of fisheries, macroinvertebrate, and amphibian populations.

Response: Staff has re-evaluated projected costs that would be associated with biological monitoring. This new information is presented in the final EA. However, the updated cost information did not change our recommendations regarding the monitoring.

Comment 32: The Water Board recommends a flow regime be considered in the final EA that recognizes the thermal improvements that can be made in the Poe reach by increasing summer flows to limit additional warming downstream. The temperature concern is primarily for the rainbow trout population. Plumas County also states that the draft EA understates the impacts of the proposed project operations on rainbow trout populations.

Response: We have analyzed the effects of the revised minimum flow regime proposed by the resource agencies on water temperature, rainbow trout, and aquatic habitat in the bypassed reach. We conclude that the revised flow regime would provide small incremental increases in fish habitat and small decreases in water temperature as compared to the minimum flows we recommended in the draft EA. As demonstrated in our analysis in section V.C.1, the largest reductions in water temperature occur as discharge approaches 300 cfs, which is achieved with the staff-identified flow schedule. Further, our analysis in the EA pertaining to the effects of project operations (e.g., instream flows and water temperature) specifically considers the habitat requirements and behavioral patterns of juvenile and adult rainbow trout. We conclude that the incremental benefits of the revised agency flow regime are not worth the substantially higher cost of the regime, compared to the staff-recommended regime.

Comment 33: The Water Board states the conclusions drawn in the draft EA pertaining to the likely reduction in water temperature (page 72, draft EA) are inaccurate, and that the change in expected temperature should be compared to existing conditions (100 – 110 cfs with leakage). Plumas County also states that the description of existing conditions in the bypassed reach as presented in the draft EA is inaccurate, and that tables 10 and 11 should be modified to reflect changes in conditions as compared to the existing leakage flow in the bypassed reach.

Response: The resource agencies have provided additional information pertaining to the predicted temperature reduction in the Poe bypassed reach that would result from variable minimum instream flow releases. Our analysis in the final EA assesses predicted water temperature as a result of PG&E's proposed release (150 cfs), the staff-recommended flow regime, the flow schedule specified by the Forest Service (condition 24[1]), and the revised agency flow regime in comparison to baseline (50 cfs) and existing (110 cfs) conditions. Tables 10 and 11 have been modified accordingly, as has our analysis of expected increases in the amount of suitable habitat available for fish (i.e., WUA). However, while we provide this additional information concerning 110 cfs, our baseline is the licensed flow of 50 cfs at the Pulga gage.

Comment 34: Butte County and American Whitewater state the draft EA does not explain the standards for evaluating aquatic habitat for fish, specifically rainbow trout. They request additional information and supporting data for the recommended minimum instream flows. In addition, they believe the draft EA does not articulate any criteria for the future condition of the trout fishery.

Response: The final EA has been modified to provide a more detailed description of the standards and methods used to evaluate instream flows and available riverine habitat in the Poe bypassed reach. In general, the use of an IFIM or similar study (e.g., wetted perimeter) is an accepted approach for the evaluation of habitat availability for targeted and managed fish species in regulated riverine systems. The IFIM for the Poe Project

was designed through a collaborative consultation process with involved resource agencies and stakeholders prior to the submission of the license application. The data provided by the applicant and the analysis provided by staff illustrate the benefits that would occur for 6 of 8 species and life stages of fish that inhabit the bypassed reach through implementation of the staff-recommended flow regime. In addition, our recommendation is based on a comprehensive evaluation of all the affected resource areas (e.g., water temperature, fish habitat, and FYLF) along with the consideration of the economic effects of the alternative flow regimes on the project.

Staff has also modified the final EA so that it more clearly describes the criteria by which results from monitoring can be used to determine the effects of new license conditions on aquatic biota. Variables to be monitored by the licensee would include: wild trout age class, average size (length and weight), available size (length), total biomass (pounds/acre), harvestable component, and angler catch rate (including catch and release). “Criteria” for the future condition of the fishery are rightly the responsibility of the appropriate fishery management agency. However, our recommended monitoring would allow for trends over time to be evaluated by the licensee in consultation with resource agencies. Plans for monitoring would be developed with input from the resource agencies so that appropriate thresholds and criteria are included in long-term monitoring efforts.

Comment 35: Butte County recommends fish passage and enhanced navigation (boating access) at Big Bend and Poe dams.

Response: Section V.C.2 of the final EA includes further evaluation of the potential effects of providing passage or removing Big Bend dam (e.g., introduction of non-native fish). We have considered the potential for additional boating through the Poe Project reach and conclude that there would be limited potential for additional boating, particularly in the vicinity of Big bend dam, which impounds a relatively small reservoir (see section V.C.5).

Comment 36: Butte County states that mitigation for the cumulative effects of hydroelectric facilities in the NFFR basin has not been provided in regards to the passage of anadromous fish species.

Response: We have included discussion and analysis of the Habitat Expansion Agreement (HEA) our final EA. As discussed in section V.C.2, this agreement, a draft of which was filed as an appendix to the Oroville Relicensing Settlement Agreement (see section IV.D.3), would provide greater protection for Central Valley spring-run Chinook salmon and Central Valley steelhead than would be provided by any previous recommendations for the Poe Project through the identification, evaluation, selection, and implementation of measures to best protect Central Valley spring-run Chinook salmon and

Central Valley steelhead in the Feather River Basin. Further, until a comprehensive fish passage plan for the Feather River is developed, provision of fish passage at the Poe dam would likely provide little benefit to anadromous fish until they have been passed around downstream facilities.

Comment 37: Butte County states that the draft EA assumes that habitat availability is the controlling limiting factor for trout and other fish species in the bypassed reach. Butte County indicates that other factors (water temperature and fish passage) affect trout success in the Poe bypassed reach.

Response: IFIM and PHABSIM modeling are standard tools used by water resource managers to evaluate habitat availability for fish in riverine reaches affected by hydroelectric facilities. These methods are based on the assumption that as suitable physical habitat is made available by flow releases, the conditions on which fish depend (e.g., predator avoidance, cover, water temperature, and food producing riffle habitat) incrementally increase with increased flow. Decreases in water temperature for the benefit of coldwater fisheries would be met with the implementation of the staff-recommended minimum instream flow schedule. Fish passage is potentially a limiting factor for trout populations in the NFFR, and our analysis includes discussion of fish passage for resident trout.

TERRESTRIAL RESOURCES

Comment 38: NPS states that it agrees with the staff statement in the draft EA that stable flows during breeding season are optimal to avoid egg mass desiccation from decreasing flows. However, NPS is still concerned about the impact on the FYLF from project operations. NPS states that data show a significant project induced impact on FYLF breeding success, and this has occurred ever since the project has been in operation and is due to rapid down-ramping at the end of spill periods leading to egg mass stranding.

Response: NPS cites new FYLF breeding survey data that were collected by GANDA in 2006; these data were not available until after the draft EA was completed. The 2006 GANDA survey data have been incorporated into the final EA analysis, as well as the Mount et al. (2006) report. The final minimum flow and ramping rate recommendations to protect FYLF considered the new data. As discussed in section VII.A.3, we have recommended an extension of conservative ramping rates for an additional 3 months to better protect FYLF.

We agree that flow fluctuations associated with existing project operations (e.g., unit outages, uncontrolled ramping, and dam gate operations) or recommended project operations, such as whitewater recreational flow releases and pulse flows, have the

potential to adversely affect FYLF, and we discuss these effects in section V.C.3 of the final EA. Our recommendations for protecting FYLF, including a ramping rate plan, interim ramping rates, and not recommending recreational boating flows, are contained in section VII.A.3.

Comment 39: PG&E provides information from Dr. Sarah Kupferberg which supports the decision not to release flows for whitewater boating in the Poe reach, due to the negative impacts on the FYLF population.

Response: We have considered the new information, provided by PG&E and the Mount et al. (2006) report co-authored by Dr. Kupferberg, in our analysis. This new information indicates that while the Poe reach has similar operational flow releases to the Cresta reach, it does not have recreational boating flows, and the number of FYLF egg masses has increased in the Poe reach and decreased in the Cresta reach during the last 2 years. Whitewater recreation flows were initiated in the Cresta reach in 2002. The spring Cresta recreational releases were suspended in 2003, due to concerns over egg mass losses observed during the spring of 2002. However, Cresta recreation releases did occur in late July through October 2003, when mid- to late-stage tadpoles and young-of-the-year frogs were still in the river. Based on other studies, there appears to be a multi-year lag time (i.e., 3 years after egg masses are laid) between young-of-the-year recruitment losses due to pulse flows (specifically whitewater recreation flows) and a quantitative response in the breeding population size. Thus, whitewater recreation flows in the Cresta reach are one plausible explanation for the differences in FYLF populations between these reaches in 2005 and 2006.

This new information further supports our DEA recommendation against whitewater recreation flow releases in the Poe reach. However, we continue to recommend that the licensee continue to monitor the FYLF populations, specifically reproductive success, in the Poe reach following any license issuance, to monitor the effects of any changes in minimum instream flows, ramping rates, or operational pulse flows.

Comment 40: Butte County states that there are flaws in the conclusions presented in the draft EA about the impacts on FYLF and macroinvertebrates from whitewater recreation flow releases, and that possible adverse impact on these resources was used as a basis to reject whitewater recreation flow releases.

Response: As indicated above, we revised section V.C.3.b, *Terrestrial Resources*, to include additional information from both PG&E and the Forest Service regarding the effects of whitewater recreation flow releases on FYLF in the Cresta reach, which support the conclusions that Butte County considers flawed. Butte County also refers to the pulse flows in the Cresta reach of the Rock Creek-Cresta project that destroyed half of the FYLF egg masses in 2006. FYLF egg mass surveys have been conducted from 2002 through 2006 on both the Cresta and Poe reaches. These data indicate a significant

difference in the population trends in these reaches (i.e., Cresta decreasing; Poe increasing). The primary difference affecting egg mass stranding in these reaches appears to be whitewater recreation flow releases in the Cresta reach and the lack of whitewater recreation flows in the Poe reach. Flow fluctuations that adversely affect FYLF also result from project operations (e.g., unit outages, spring spilling, dam gate operations), but these appear to be similar in both reaches.

It is our conclusion that the whitewater recreation pulse flows, as recommended during the FYLF reproductive season, would be likely to adversely affect the NFFR FYLF population because (1) the Poe reach subpopulation appears to be critical to the continuation of this species in the NFFR; (2) PG&E cannot effectively control ramping rates at the Poe and Rock Creek-Cresta dams at this time; (3) mortalities have been observed as a direct result of pulse flows; (4) herpetologists attribute Cresta reach population declines to whitewater recreation releases; (5) controlled experiments demonstrate direct and indirect effects of flow fluctuations and sustained high flows; and (6) the cumulative effects of hydropower operations on the NFFR FYLF population are unknown. Based on these effects on FYLF and our finding that adequate whitewater recreation opportunities are available upstream at the Rock Creek-Cresta project, we do not recommend whitewater pulse flows.

Comment 41: The Forest Service states that, based on preliminary Poe 2006 study results for FYLF abundance, it believes the analysis contained in the draft EA, as it pertains to FYLF habitat is both incomplete and inaccurate. The Forest states that the description of the FYLF habitat does not include recently developed information and therefore the conclusions are in question. The main concern is related to the minimum flow schedule and temporary elevations in stage level from project operations. The Forest also includes a memorandum from a U.S. Department of Agriculture wildlife herpetologist to substantiate its concerns. The Sportfishing Alliance supports a restriction of flow fluctuations following the onset of FYLF breeding.

Response: We have revised the final EA to consider the 2006 GANDA FYLF survey data; the information provided by A. Lind, herpetologist, in the Forest Service Pacific Southwest Research Station; and the report by Mount et al. (2006) in the final EA analyses (see responses to previous comments on the FYLF). Initially, GANDA concluded that optimal FYLF breeding and tadpole rearing habitat in the Poe reach decreased as instream flows increased above 150 cfs, and that 150 cfs provided the greatest amount of suitable habitat based on 2002 and 2004 data (GANDA, 2004c). We concur with the Forest Service that the results of the 2005 and 2006 FYLF monitoring indicate GANDA's initial conclusions regarding the relationship of FYLF habitat and flow were not correct (GANDA, 2004c), and that at current population levels, habitat does not appear to be a limiting factor at higher flows.

In the final EA, we do not recommend whitewater recreation flow releases that would adversely affect breeding FYLF, and we do recommend ramping rate restrictions for releases from Poe dam to protect all FYLF early life stages, from egg masses through late-stage tadpoles.

GANDA survey results indicate FYLF reproduction begins in mid-April in dry or critically dry years. Therefore, the recommended pulse flows to maintain aquatic habitat (i.e., flush fine sediment and organic detritus), which would be initiated between February 1 and February 15, should not affect FYLF.

Comment 42: Plumas National Forest states that because a majority of the Poe Project lies within the Plumas National Forest it should be operated in a manner that complies with the Plumas National Forest Land and Resource Management Plan (as amended January 2004) and assures the protection of forest resources.

Response: We have recommended measures that are generally consistent with the section 4(e) conditions filed by the Forest Service for the Poe Project, and note that any license issued will include those conditions in their entirety.

Comment 43: PG&E disagrees with several aspects of staff's analysis of effects on riparian habitat. PG&E states that the riparian vegetation loss from higher flows estimated in the draft EA is based on a flow of 1,400 cfs, and not the staff-recommended minimum flow of 275 to 300 cfs, and there is no basis for the use of 1,400 cfs. It further states that there would be a minimal increase in water surface elevation (less than 1 foot) between current flow levels and the staff-recommended flows, and there would unlikely be any measurable effect on riparian habitat. PG&E also believes that storm and flooding events contribute to vegetation loss and that it is not solely an effect of project operations.

Response: Our analysis in the draft EA regarding possible effects on riparian vegetation from increases in minimum flows is not based upon 1,400 cfs; our reference to the 1,400 cfs and the amount of inundation at that flow level refers to flooding that could be expected at higher flow releases such as pulse or recreation flows. We clearly state that PG&E's study does not provide estimates of potential vegetation losses with long-term increases in flow associated with any of the minimum flow proposals. It is because of this uncertainty, along with the uncertainty of the effects of pulse flows on riparian vegetation, that we recommend riparian vegetation monitoring. Depending upon channel morphology, even a small increase in river stage could result in a measurable change in riparian condition.

Comment 44: PG&E states that there is no need for a riparian monitoring program, and that none of the resource agencies have recommended such a program. It further notes that annual monitoring immediately following the onset of increased flows allows insufficient vegetative response time and would yield little useful information. Other

FERC projects have implemented similar monitoring programs, but at 5-year intervals following an initial baseline habitat assessment. PG&E also states that the long-term monitoring project that it is funding within the Feather River watershed, including at the Rock Creek-Cresta Project, would provide the type of information desired by staff and the agencies, and would negate the need for a similar study in the Poe reach.

Response: Staff conducts an independent analysis of the effects of relicensing hydroelectric projects and may make recommendations for measures not recommended by other agencies. We continue to recommend a riparian monitoring program because, although the Poe reach may be somewhat similar to the Rock Creek-Cresta reach, the flow regime that will be required in the Poe reach will not be identical to that at Rock Creek-Cresta, and the response of riparian vegetation to the new flow regime may not be the same. We have, however, reconsidered the monitoring frequency and timing of the initial monitoring effort and present new recommendations in the final EA.

RECREATIONAL RESOURCES

Comment 45: Butte County and American Whitewater disagree with staff's recommendation that proposed and recommended recreational enhancements either within the Rock Creek-Cresta Project boundary or immediately adjacent to it should be addressed within the context of that project's license. Butte County and American Whitewater contend that these locations have a nexus to the Poe Project.

Response: Although those enhancements may be in proximity to the Poe Project, they are nevertheless located within the Rock Creek-Cresta Project boundary and must be administered under that license.

Comment 46: Butte County and American Whitewater disagree with staff's estimate of baseline use at Sandy Beach and contend that there is a definite need for two restrooms at this site. Butte County and American Whitewater provided a newspaper article and a declaration by David Steindorf indicating that visitor use at Sandy Beach was exceptionally high on Labor Day weekend in 2005 and 2006.

Response: We recognize that visitor use at Sandy Beach over Labor Day in 2005 and 2006 far exceeded the number of persons observed at this site by PG&E during its 1999 recreation user count study. However, it appears that use levels for one weekend in 2005 and one in 2006 were an aberration and not a consistent pattern. As discussed in section VII.A, *Recommended Alternative*, of this final EA, we agree with PG&E's proposal and the Forest Service specification to reevaluate use at this site in 5 years, to determine if additional facilities are warranted. We also are recommending development of a recreation management plan that would provide for monitoring recreational visitor use at Sandy Beach. If the increased use is consistent, and additional facilities are needed, it would be addressed through monitoring.

Comment 47: PG&E does not believe additional river access or trails along the project's bypassed reach for either public angling access or hiking is appropriate. PG&E does not support a new trail upstream of Bardee's Bar due to the low anticipated recreational use, high construction cost, and the corresponding risk to sensitive resources. PG&E provided a feasibility report on modifying the abandoned construction road for use as a trail. PG&E contends that it has provided adequate new recreational opportunities where feasible and appropriate.

Response: We continue to recommend that PG&E develop a trail in the project area to address the expected hiking increase in the area, and to divert users away from sensitive resources. Through comments on the draft EA (see Comment 48, below), we became aware of an additional opportunity to develop a trail downstream of Bardee's Bar. In section VII.A, *Recommended Alternative*, of this final EA, we recommend that PG&E investigate this trail opportunity and report its findings to the Commission, including its preference and rationale for developing either the upstream or downstream trail location.

Comment 48: Michael F. Taylor provides an assessment of the Bardee's Bar trail recommended by Commission staff in the draft EA. Mr. Taylor points out that converting the existing abandoned construction road to a trail would be more than a casual undertaking because of numerous rock avalanches that have obliterated the road in places, and replaced it with deposits of loose rock rubble. Mr. Taylor disagrees with Commission staff's recommendation regarding this trail and instead describes an alternative abandoned trail that provides access to the NFFR approximately 0.75 mile downstream from Bardee's Bar. Mr. Taylor points out that this existing trail is approximately 2.8 miles long and closely follows the river, and suggests that this trail should be considered to provide hiking opportunities in the area. Mr. Taylor describes the trail and provides a detailed description of the work required to make the trail more functional. Mr. Taylor also states that the Forest Service has mapped the location of this trail using a global positioning system.

Response: Neither the Forest Service nor PG&E have provided any information on the trail proposed by Mr. Taylor. We agree, however, that hiking opportunities are needed in the project area. Section VII.A, *Recommended Alternative*, of this final EA, recommends that PG&E investigate the additional trail opportunity described by Mr. Taylor and report its findings to the Commission, including preference and rationale for developing either the upstream or downstream trail location.

Comment 49: NPS and the Alliance both support the development of hiking trails for river access both upstream and downstream of Bardee's Bar. NPS and the Sportfishing Alliance point out that the trail recommended by Michael Taylor in his comments on the draft EA would provide significant angling access that is not currently available. NPS

and the Sportfishing Alliance believe there is a discrepancy in the expected cost of the trails and would like a feasibility study conducted for both of the proposed trails.

Response: We recognize that the trail described by Michael Taylor closely follows the NFFR and would therefore provide additional angling opportunities in the Poe bypassed reach. We have recommended that PG&E investigate this trail opportunity and report its findings to the Commission, including its preference and rationale for developing either the upstream or downstream trail location. In its comments on the draft EA, PG&E provided a feasibility report on modifying the abandoned construction road for use as a trail, including a cost estimate. This estimate is significantly higher than the staff estimate provided in the draft EA. Our recommended feasibility study should provide the additional information concerning expected benefits, environmental effects, and costs needed to inform a decision concerning hiking trails.

Comment 50: PG&E points out that Bardee's Bar Road is a public road that is used to access a project recreation site, but should not be included in the project boundary. PG&E points out that it pays taxes to maintain public roads and therefore, should not be responsible for such maintenance.

Response: As discussed in section V.C.5, *Recreational Resources*, Bardee's Bar Road, or Butte County Road 54545A, provides access to some private lands, some NFS lands of the Plumas National Forest, and the PG&E parcel on which Bardee's Bar is located. We recognize that the maintained section of Bardee's Bar Road located on PG&E land supports recreation at Bardee's Bar and provides access to the project, and will continue to do so throughout the term of any license issued for this project. Therefore, we continue to recommend including this section of Bardee's Bar Road in the project boundary.

Comment 51: NPS, Butte County, American Whitewater, and the Sportfishing Alliance advocate including Bardee's Bar Road to its juncture with the primary road in the Poe Project boundary. These entities would like for PG&E to upgrade and maintain the road so that it is readily passable by two-wheel drive vehicles. NPS and the Sportfishing Alliance point out that the road's current condition not only limits access for potential recreational users, but also limits the ability of the Butte County Sheriff's Department and the Forest Service to adequately police the road.

Response: We recommend including only the northernmost and southernmost sections of the Bardee's Bar Road located on PG&E land in the project boundary because the entire road is not used solely to access project facilities. In addition to PG&E and recreationists accessing Bardee's Bar, Poe beach, and the Poe powerhouse, Bardee's Bar Road is also used by Union Pacific railroad personnel and by private landowners to access their personal dwellings and/or land.

Comment 52: The Sportfishing Alliance states that real-time flow information should be available for recreational users of the Poe bypassed reach. The Sportfishing Alliance, Butte County, and American Whitewater recommend publishing flow data for the reach between Poe dam and the current location of the NF23 gage either by (1) moving the compliance gage upstream of both Flea Valley and Mill creeks, or (2) by measuring the inflow from Flea Valley and Mill creeks on a real-time basis to the nearest cfs and then subtracting this amount from the measured flow at NF23, to determine releases from Poe dam. The Sportfishing Alliance, Butte County, and American Whitewater assert that real-time flow information for the public be available to the nearest cfs instead of to the nearest 50 cfs. The Water Board recommends considering the merits of gage installation at or immediately downstream of Poe dam.

Response: The drainage area at gage NF23 is 1,953 square miles and at Poe dam approximately 1,942 square miles, indicating that a drainage area of about 11 square miles enters the NFFR between Poe dam and the gage. Currently, there is a non-recording low flow gage NF66, which is read almost daily, about 0.2 river mile below Poe dam. Examination of the differences in the flow records of these two gages, which are separated by about 1.4 river miles, shows that the releases from Poe dam account for the vast majority of the flows in this reach between May 1 and November 1 of most years. In the remainder of the months, when high runoff events occur from the low elevation watersheds of Flea Valley and Mill creeks, a higher amount of flow reaches this reach. However, due to the limited storage capacity of Poe reservoir, most of these occurrences coincide with spillage events at Poe dam, which are already measured at gage NF23. Installation of gages at Flea Valley and Mill creeks would result in substantial capital and annual costs with very limited benefits for either compliance or recreational use during the vast majority of most years. Construction of gages at these locations could also require a concrete weir structure to allow for the accurate measurement of low flows, and these structures could become a hindrance to fish passage from the bypassed reach into these tributaries. Moving gage NF23 from its present location where it has been since 1937 to near Poe dam or upgrading gage NF66 would also result in substantial costs and limited benefits. We are recommending the development, in consultation with the agencies, of a streamflow gaging plan. Specifics concerning data reporting and availability would be contained in that plan.

Comment 53: Butte County, American Whitewater, and Plumas County disagree with staff's conclusion that most people traveling through the Feather River canyon are actually on their way to a destination beyond the canyon and do not see the canyon as a destination in itself. Plumas County asserts that people traveling through the Feather River canyon do not linger there due to the lack of safe and comfortable places to sightsee, rest, and relax. Butte County points out that, prior to construction of PG&E's hydroelectric projects, the NFFR was a popular destination for fishing and camping, and providing additional recreational facilities in the Feather River canyon may provide similar results. Butte County, American Whitewater, and Plumas County support the

development of a visitor center in the Feather River canyon, and Plumas County suggests including flush toilets, running water, fee showers, and laundry amenities in the visitor center.

Response: We recognize that opportunities exist for enhancing visitor use of the Feather River canyon and that a visitor center would benefit visitors to the area. We maintain, however, that the Poe Project encompasses only a small portion of the entire Feather River canyon and therefore it would not be appropriate to recommend a license condition on the Poe Project relative to a Highway 70 visitor center.

Comment 54: Plumas County states that the Commission should accommodate enhancement measures that involve more than one hydroelectric project, such as funding a river ranger for the entire North Fork Feather River.

Response: In section V.C.5, *Recreational Resources*, of this EA, we describe how the addition of a river ranger along the project bypassed reach could enhance the recreation experiences of some of the visitors to the Poe Project bypassed reach. However, we did not recommend including this particular measure in any license issued for the Poe Project because we have no indication that the proposed measure would reduce any existing recreational conflicts or further protect project environmental resources for the term of the new license.

Comment 55: Several entities commented on the fact that the draft EA did not include any recommended recreational flow releases. Water Board states that the draft EA does not recommend measures for protecting the REC-1 rafting and canoeing beneficial use as identified in the Central Valley Regional Water Quality Control Board Basin Plan, specifically for the NFFR, and offers no alternative to protecting that use or meeting expressed demand. Similarly, Plumas County believes that a more accurate assessment of flows and habitat relationships should be conducted before eliminating a beneficial use (boating flows) in the Poe bypassed reach in August, September, and October. Eric Petlock and Bruce Hicks describe the rarity of boatable flows occurring in the Poe bypassed reach and point out that the Poe bypassed reach is not adjacent to State Highway 70, and therefore provides the atmosphere of boating in the wilderness. Eric Petlock states his belief that this reach has the best potential for commercial rafting opportunities on the NFFR. Butte County and American Whitewater point out that boating experience at the Rock Creek-Cresta Project confirms that there is high unmet demand for whitewater boating opportunities in Butte County and that as demand increases due to improvements at one location, boating use will shift to areas that are not as crowded. Butte County and American Whitewater also point out that providing boating runs of varying difficulty, like those at the Poe Project, would allow individuals with different skill levels to participate. Butte County and American Whitewater propose an amended boating flow schedule.

Response: As described in section V.C.5, *Recreational Resources*, of this EA, flows suitable for whitewater boating in the Poe bypassed reach (between 500 and 2,500 cfs) continue to occur throughout the year. Therefore, the REC-1 beneficial use included in the Basin Plan appears to be protected.

As discussed in section VII, *Comprehensive Development and Recommended Alternative*, of this final EIS, the demand for recreational boating in the area can be met through the adaptive provision of additional recreational flow release dates at other upstream projects. Additionally, the economic cost of boating releases would be high through the loss of energy generation.

Finally, as discussed in section V.C.3, *Terrestrial Resources*, the Forest Service has filed information with the Commission indicating that larger/late developmental stage FYLF tadpoles appear less able to withstand increasing water velocities than mid-developmental stage tadpoles. Thus, late summer pulse flows, i.e., recreational boating flows, that occur when late stage tadpoles are still in the river may have greater negative effects than previously expected. In section VII.A, *Recommended Alternative*, of this EA we are recommending development and implementation of an FYLF monitoring plan that would include annual surveys. We anticipate that long-term monitoring would identify trends and factors affecting FYLF populations and allow for adaptive management. At this time, we continue not to recommend any recreational boating flow releases in the Poe bypassed reach. However, based on information provided in the reports prepared as part of the FYLF monitoring plan, recreational boating flow releases may be appropriate at some point in the future.

Comment 56: The Sportfishing Alliance proposes limiting the number of days that whitewater boating is allowed on the river and limiting the magnitude of flows to no more than 200 cfs above base flows. The Sportfishing Alliance also proposes that no boating flows occur until the adaptive management coordinating committee reaches consensus on the appropriate monitoring plans and measurable metrics for both frogs and boaters.

Response: We are currently not recommending any recreational boating flows, which should address the Sportfishing Alliance's concerns. In addition, however, we are not familiar with either the objectives or members of the adaptive management coordinating committee.

Comment 57: Butte County, American Whitewater, and Risa Shimoda propose that PG&E develop a whitewater play feature on the NFFR below the Cresta powerhouse. Butte County and American Whitewater suggest that the feature would consist of a limited modification of the river channel to create waves, providing a challenge for boaters. Butte County and American Whitewater point out that a whitewater feature would not result in the loss of any power generation or require an assessment of flow

fluctuations. Butte County and American Whitewater assert that the feature would provide boating opportunities every day, therefore addressing the loss of year-round boating opportunities on the NFFR due to the project.

Response: We understand that whitewater parks or features provide a variety of whitewater activities for different skill levels and can be designed to accommodate low water flows. PG&E, however, has provided recreational flows to facilitate whitewater boating one weekend a month during the summer and early fall months (June – October) at the Rock Creek-Cresta Project, immediately upstream of the Poe Project. Any further whitewater opportunities at the Rock Creek-Cresta Project should be considered within the context of that license.

Comment 58: The Forest Service believes that the draft EA proposal eliminating (whitewater) boating opportunities is based on outdated information regarding the FYLF.

Response: In the final EA, we considered the 2006 GANDA FYLF survey data, the information provided by A. Lind, herpetologist with the Forest Service Pacific Southwest Research Station, and the report by Kupferberg et al. (2006) in our revised recreation flow analysis.

Comment 59: Butte County and American Whitewater disagree with staff's analysis of the North Fork Feather River Enhancement Fund. Butte County and American Whitewater believe that the project has significant unmitigated impacts on the NFFR.

Response: We have recommended measures to mitigate the ongoing effects of the project. The recreation fund and any associated facilities and services, however, do not have a clear nexus to the Poe Project, in that the fund could be used for enhancements outside of the project area.

DEVELOPMENTAL ANALYSIS

Comment 60: PG&E questions the cost estimate provided in the draft EA for the biological monitoring plans. PG&E estimates that the cost would be \$75,000 per year and not \$27,500 as estimated by Commission staff in the draft EA. Further, PG&E estimates that the cost per year for benthic macroinvertebrate monitoring would be \$20,000 and not \$10,000 as estimated by Commission staff. Finally, it estimates the cost of amphibian monitoring at \$51,000 each year and not \$12,500 as estimated by Commission staff. PG&E bases these estimates on similar studies conducted at the Rock Creek-Cresta Project and states that the typical costs associated with agency consultation to develop these plans is between \$8,000 and \$10,000.

Response: We have revised our cost estimates for these and other measures in section VI, *Developmental Analysis*, of the final EA.